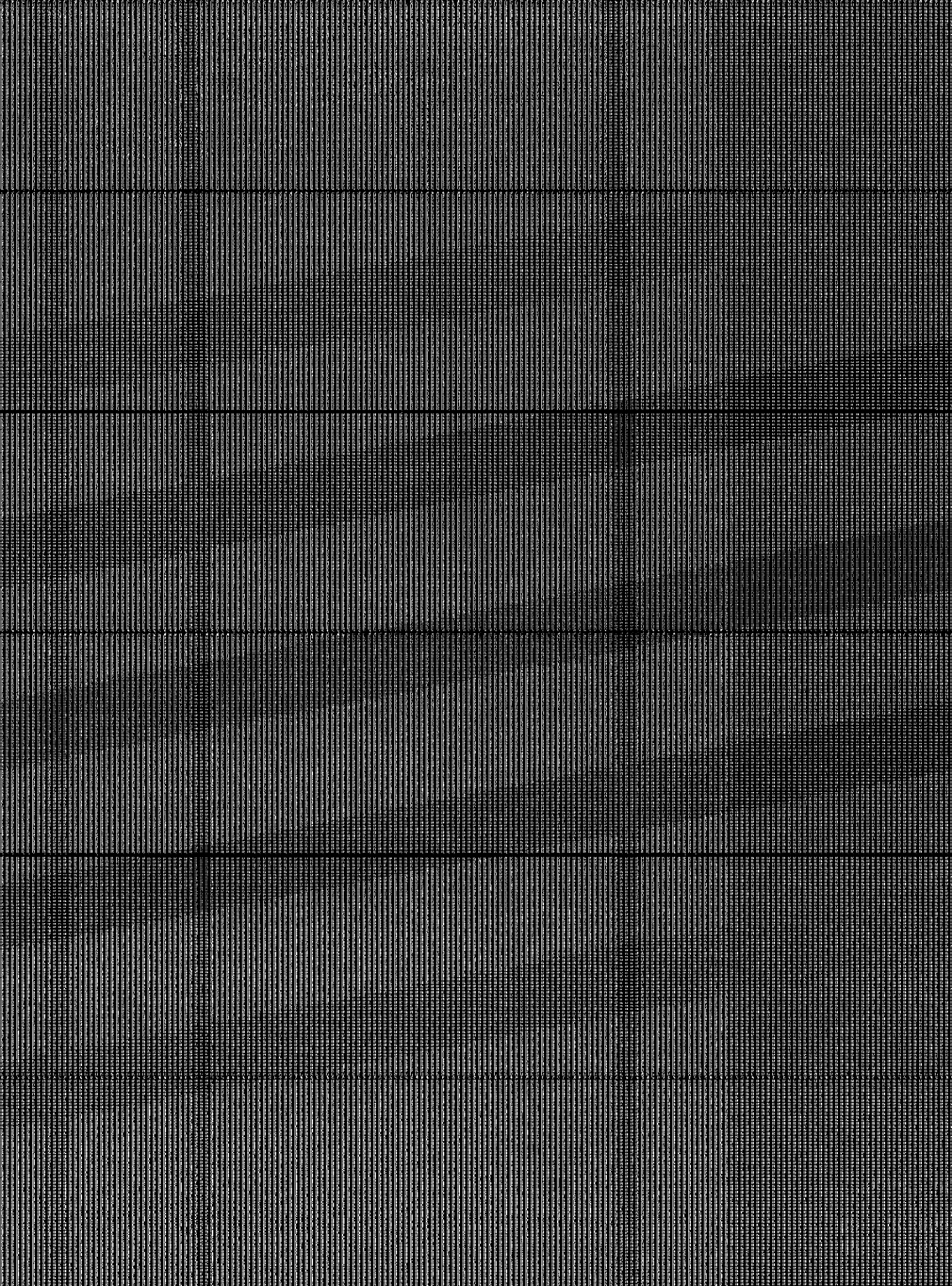

PREFACE

Growth of population and of production and marketing agricultural products in the 11 Western States is of concern to farmers, marketing firms, and government agencies. Because of the impact of this growth on individuals and industries engaged in producing and marketing farm products, projections were made of the quantities of food produced, processed, marketed, and consumed in the Western Region for selected years to 1985. It is believed that such projections are useful in long-term planning.

This is one of three recent reports in the U.S. Department of Agriculture appraising the long-term outlook for producing, processing, and marketing agricultural commodities in the 11 Western States. The other two publications are: Long-Term Production Prospects for Western Agriculture, Adon Poli, U.S. Department of Agriculture, Agricultural Economic Report No. 33, 1963; and Marketing Western Fruits and Vegetables, Long-Term Outlook, Dale G. Stallings, U.S. Department of Agriculture, Economic Research Service Report No. 77, 1963.

Since this report was completed, the Bureau of the Census has published new alternative series of projected State populations. These projections take into account data on interstate migration from the 1960 Census and changes in State populations since 1960. Projected populations in the series considered most suitable for projecting regional data, Series II--B, are higher for California than those used in this report. However, new projected populations for Washington and Oregon are lower than those used. For the Mountain States, the new projections differ only slightly from earlier projections. New population projections are shown in footnote 1 to appendix table 3, page 45.

This study was under the general direction of William H. Waldorf formerly of the Economic Research Service (ERS). Special acknowledgement is made to Donald Jackson formerly of the ERS for discerning discussions and suggestions and critical review of the manuscript. Discussion of various parts of the study with Byron E. Taylor, Vernon McMinimy, and Gaylord Gardner, all of the Economic Research Service, were helpful.

CONTENTS

June 1965

SUMMARY AND CONCLUSIONS

The rapid growth of population, income, and agricultural production in the Western Region raises questions about future changes in the production, processing, and marketing of farm food products in the Region. Shifts in consumption from fresh fruits and vegetables and relatively unprocessed foods to processed foods and from starchy foods to meat products and processed fruits and vegetables affect, to some extent, the quantities of these foods produced within the Region. Such shifts also affect the quantities of food shipped into and out of the Region and the kinds of processing and distribution services required.

With the rapid growth in population which is expected to continue to 1985, it might be thought that production would be diverted more and more to supplying consumption within the Region. For several commodities, this will occur. However, the Western Region has an advantage in the production of those groups of commodities which need a relatively mild climate, irrigation, or a combination of such factors. The result is that substantial net surpluses of fresh and processed fruits and vegetables, nuts, and beet sugar are shipped to rather distant markets outside the Region. For these commodities, the total net surplus of production over consumption is expected to increase from 20 billion pounds (retail weight) in 1960-61 to 35 billion pounds in 1985. Fresh and processed potatoes show the largest projected surplus in 1985 at 15 billion pounds, and processed fruits and vegetables the next largest surplus of 9 billion pounds.

The principal net production deficits for the Western Region are in meat, poultry, dairy, and flour products. The total net deficit for these commodities is expected to increase from about 4 billion pounds in 1960-61 to 8 billion pounds in 1985. The deficit for the meat and poultry products group is much larger in terms of value than that for dairy or flour products.

For the other groups of commodities, production and consumption are about in balance. The perishable and bulky characteristics of fluid milk and bakery products cause them to be produced relatively near the point of consumption. For some of the other product groups, such as eggs, the production and consumption are about in balance due to various factors which affect the comparative advantage of the Region in producing and marketing them.

Productivity of labor in food processing has increased rather steadily over long periods of time; it is assumed that such productivity will continue to increase at the rate of 2 to 4 percent, depending upon the industry, to 1985.

On the basis of the projected labor productivity increase for each industry, employment is projected to increase in only two major industry groups. They are processed fruits and vegetables with an increase of 17 percent and bakery products with an increase of 35 percent, between 1954 and 1985. Small decreases in employment of 5 percent for meat packing and 4 percent for flour and rice milling and somewhat larger decreases of 18 percent for dairy products and 16 percent for beet sugar are projected from 1954 to 1985.

Increases in average hourly earnings between 1947-58 in food processing ranged from about 55 percent in processed fruits and vegetables to 90 percent in dairy products. Earnings during that period increased somewhat faster than productivity in each of the groups of food industries except beet sugar. Thus, labor cost per unit of product increased in each of the industries except beet sugar where there was a decline.

The trend toward fewer and larger plants continued at a fast pace in the West between 1947-58. Size of plants increased in each of the industry groups. Average plant size in the group of industries processing fruits and vegetables increased almost 100 percent--the largest gain of any group.

Total deflated wholesale sales of groceries and farm products in the Western Region are projected to increase about 180 percent from 1954 to 1985. With projected increases in deflated sales per employee, employment is projected to increase 60 percent in the same period.

Earnings of employees in establishments wholesaling groceries and farm products increased about 50 percent from 1948 to 1958. Increases in labor productivity were large enough that unit labor costs decreased by about 5 percent over the same period of time. The number of wholesale establishments handling groceries and farm products increased 15 percent, and deflated sales per establishment increased 40 percent during this period.

Retailing of foods in terms of deflated value of sales has increased somewhat faster than changes in population in the Western Region. From 1954 to 1985, sales are projected to increase 155 percent for food stores and 182 percent for eating places compared with a projected population increase of 118 percent. Labor productivity in food retailing is difficult to determine because of changes in the services performed, such as the shift to self service. With projected increases in productivity, employment is projected to increase 59 percent in food stores and 144 percent in eating places from 1954 to 1985.

Earnings of employees in retail food establishments increased 35 percent in food stores and 27 percent in eating places from 1948 to 1958. Unit labor costs increased 34 percent in food stores and 22 percent in eating places in the same period of time. The increase in unit labor costs in food stores and eating places reflects the rather small increases in labor productivity.

The number of food stores in the Western Region decreased 19 percent while the deflated sales per store increased 88 percent from 1948 to 1958. The number of eating palaces increased 26 percent, while deflated sales per establishment increased 26 percent over the same period.

Based on the projections of this study, it is likely that the Western Region will tend to specialize more in the production, processing, and marketing of fresh and processed fruits, vegetables, nuts, and beet sugar, and to ship in more dairy products, meat, poultry, and flour products. Production as a percentage of consumption within the Western Region will increase only slightly for the former group of commodities and either decline slowly or remain about the same for the latter commodities. However, small changes in the ratio of production to consumption in the Region result in large changes in the quantities shipped in or out, because of the growth and size of the market in the Western Region.

Despite rather substantial increases in foods produced, processed, and marketed in and from the Region, employment in food processing industries will increase only slightly by 1985. Rather large increases in employment are projected for wholesale firms and retail food stores, with the largest increase of all projected for eating places.

LONG-RUN PROJECTIONS OF FOOD PROCESSING AND MARKETING IN THE WEST

By Dale G. Stallings, Agricultural Economist
Marketing Economics Division
Economic Research Service 1/

INTRODUCTION

Food processing and marketing in the Western Region are large, fast-growing industries. 2/ In 1958, the value of shipments by food processing industries amounted to about $7.7 billion. Sales by wholesale food establishments amounted to about $11.7 billion and by retail food stores and eating places about $10.2 billion.

Growth in food processing and marketing has also been rapid. From 1947 to 1958, the volume of food processing services increased about 65 percent. Volume of wholesaling increased about 65 percent and retailing, almost 55 percent during this period. (14 and 15) 3/

Several factors affect the quantities of food products produced and marketed from the Western Region. Costs of production and transportation, growth of population and consumer income, type and quality of product, and seasonality of production are important. For example, high transportation costs may limit the marketing of nonspecialty products from the West unless offset by lower production costs or a higher quality product. Producers of specialty products, or those with off-season production, face less competitions from other areas, and transportation costs are less important.

For locally produced commodities which are consumed only within the Region, long distances from outside sources of supply protect the producers within the Region. They can sell their product for approximately the cost of production in competing regions plus the cost of transportation from those regions.

Higher wage costs in the Western Region may be a problem for the producer, processor, and marketer. Unless these higher costs are compensated for by higher productivity, they may affect the Region's ability to compete for markets. On the other hand, rapid growth in population in the West might result in less specialized production and more production of food commodities consumed within the Region. Such a shift would affect the kinds of marketing services required. Projection of quantities of commodities produced and consumed within the Region should indicate whether or not production and marketing will be directed more toward consumption within or outside the Region and the production and marketing problems that will predominate.

Another factor is the importance of irrigation in the West. Projections of future food needs and the production within the Region provide a means of gaging

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1/ Dr. Stallings has resigned and is now on the staff of the California State Polytechnic College.

2/ The Western Region corresponds to the Bureau of the Census geographical classification. It includes the 3 States in the Pacific Division and the 8 States in the Mountain Division. The Pacific Division has been further divided into California and Washington-Oregon in most sections of this study.

3/ Numbers in parentheses refer to items listed in the Bibliography, p. 35.

future irrigation and land needs. However, future productive capabilities and how they might be achieved were not specifically considered in this study. 4/

Purpose of Study

A major objective was to study the changes in processing, wholesaling, and retailing of agricultural food products in the Western Region and to project changes that might occur under specified conditions by 1985.

Another objective was to project the quantities of each type of food produced and consumed within each area of the Region and the consequent inshipments and outshipments. These quantities were then used to project employment in processing, wholesaling, and retailing. Projected changes in quantities also serve as indicators of changes in marketing facilities required.

A third objective was to examine some of the changes in costs of processing and marketing food products. Since the Western Region ships large quantities of some commodities outside the Region, changes in costs of processing and marketing would tend to affect the quantities shipped.

Scope of Study and Sources of Data

Projections of quantities of agricultural products produced and consumed in each State in the Western Region were limited to farm food products. Coverage includes as completely as possible the farm foods in the Census of Manufactures and fresh fruits and vegetables, fresh eggs, and nuts. The foods covered in the estimates of consumption are the same as those in the Household Food Consumption Survey, 1955 (13).

For food processing, data on value of shipments, value added, employment, payroll, and other items were obtained from the 1947, 1954, and 1958 Censuses of Manufactures. From these data, calculations were made to derive changes in labor productivity and in unit labor and processing costs. Projections of employment were based on estimated increases in labor productivity and projected changes in quantities of foods processed.

Sales, employment, payroll, and other data for wholesaling and retailing were obtained from the 1948, 1954, and 1958 Censuses of Business. Food and nonfood farm products are covered in wholesaling, since it was not possible to isolate data for food products only. Projections of employment were based on estimated increases in productivity and projected increases in deflated wholesale and retail sales.

Data on quantities of food processed were obtained or derived from production of manufactured products, slaughter statistics, and other production data of the U.S. Department of Agriculture and canned pack statistics from the Western Canner and Packer. Data on quantities of foods marketed fresh or unprocessed were obtained from publications of the U.S. Department of Agriculture. All data on production and consumption were converted to pounds of food at the retail distribution level.

Projections of consumption and production were based on annual data for the base period 1947-61. Sales and employment in food wholesaling and retailing were projected on the basis of Census data for 1948, 1954, and 1958.

4/ Adon Poli (11) analyzed prospective changes in land use, yields, and crop production possibilities to 1975. Production possibilities were not compared with the production projections of this study because there was not enough time to complete the research.

METHODS AND ASSUMPTIONS

Methods 5/

Per capita food consumption figures for the 11 Western States were estimated from equations relating per capita consumption to per capita income and trends in consumption. 6/ Total consumption was obtained by multiplying per capita consumption by population estimates. To obtain projected consumption, projections of per capita income and population also were made. 7/

Since it was not possible to consider the various factors affecting interregional competition for each commodity or commodity group, simplifying assumptions were necessary in projecting production. It was assumed that the ratio of production to consumption within an area would reflect demand--related to growth in population and income--as well as costs of production and other factors affecting comparative advantage in production. In addition, the production-consumption ratio is more stable than the production figures. Production-consumption ratios were calculated for each commodity on which production data were available for each of the 11 States in the Western Region. These production-consumption ratios were projected and then applied to the previously projected consumption to give projected production. As a check on the consistency and reasonableness of projected production, the change in the West's share of production from 1957-58 to 1980 was estimated for the commodities covered.

Assumptions

Assumptions as to population growth for all the 11 Western States are based on U.S. Bureau of the Census population projections (16). The projections assume that fertility rates remain at the 1955-57 level (appendix table 3).

Per capita income growth for each State in the Western Region was assumed to be related to growth in United States per capita gross national product. To project State per capita incomes, the relationship of State per capita income to United States per capita gross national product in the years 1946-61 was used along with projected gross national product. Projections of gross national product were made by Rex F. Daly. 8/

Population is the principal factor affecting total food consumption. In projecting per capita food consumption three assumptions are made. The first is that the average per capita income level and trends in tastes are the principal determinants of the per capita consumption of most food items. Secondly, it is assumed that

5/ See Appendix A for a more detailed discussion of the methods used.

6/ The consumption-income relations for food were developed by William H. Waldorf, formerly of ERS, from Household Food Consumption Survey (13), and discussions with U.S. Department of Agriculture commodity specialists. Trends in consumption are based on U.S. consumption data from: Rex F. Daly, Agriculture in the Years Ahead. A talk presented at the Southern Agricultural Workers Conference, 1964. See Appendix B.

7/ See Appendix A for a discussion of the methods of projecting the per capita incomes and population.

8/ For an analysis and appraisal of long-run projections and a comparision of several recent economic projections, see Rex F. Daly (3).

per capita consumption at the increased average levels of projected income will correspond to consumption at the same average levels of income in 1955. (This was the year for which income-consumption relations were available.) Thirdly, the income elasticities were assumed to be constant to facilitate the calculations of food consumption. 9/

Changes in relative prices are important in shifts in both production and consumption of agricultural commodities. Frequently, changes in prices are caused by new technological developments which lower the cost of production. Changes in tastes shift the demand curves and thus tend to raise or lower the price of food products; but these changes are likely to occur more slowly over a longer period of time. While some shifts in relative prices will occur over time, it is not possible to project them. Therefore, it is assumed that relative prices among commodities and among regions will remain the same.

Substitution of capital for labor, technological developments, economies of scale, and increased investment in human capital affect labor productivity. These determinants could not be accurately measured or predicted. Consequently, past trends in labor productivity are assumed to continue at the same rate per year.

PRODUCTION AND CONSUMPTION OF FARM FOOD PRODUCTS

Relative Importance of the Food Processing Industries

In 1958, the value added by industries processing domestic farm food products in the West amounted to over $2.2 billion. This was about 17 percent of the U.S. total.

The more important food processing industry groups in the Western Region in terms of value added in 1958 were processed fruits and vegetables, about $600 million; dairy products, about $420 million; bakery products, about $396 million; and meat products, about $287 million (table 1). The more important industries within the groups in 1958 were canned fruits and vegetables, $410 million; fluid milk, $345 million; bread and related products, about $335 million; and meat packing, about $195 million. 10/

California with 57.2 percent of the population of the Region in 1958 accounted for 64.7 percent of the value added in food processing. Washington-Oregon had 17.5 percent of the population and 17.6 percent of the value added, and the Mountain States, 25.3 percent of the population and 17.7 percent of the value added.

9/ The result of this is that the same absolute increase in income at any level of income will affect consumption by the same amount. This allows the use of average levels of projected income and avoids the need for dealing with the distribution of projected income among the population.
Although income elasticities can be expected to change somewhat as incomes increase, the effect on consumption projections is probably minor except for a few commodities. Beef consumption was adjusted in the projected years to allow for some decrease in the income elasticity as average incomes increase.

10/ Bread and related products includes bread, cakes, and other "perishable" bakery products.

Table 1.--Food processing industries: Value added in each food group in California, Washington-Oregon, Mountain States, and Western Region, 1954 and 1958 1/

Industry	California		Washington-Oregon		Mountain States		Western Region	
	1954	1958 2/	1954	1958 2/	1954	1958 2/	1954	1958 2/
	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
Meat and poultry products ..	131,536	157,318	39,828	51,360	49,384	76,724	220,748	287,212
Dairy products	169,748	245,576	62,340	81,746	70,422	94,395	304,902	418,832
Processed fruits and vegetables	334,786	460,189	84,247	116,274	14,224	22,644	433,257	599,107
Grain mill products 3/	20,868	57,792	21,809	24,738	19,433	25,327	87,842	119,809
Bakery products	166,154	245,976	51,587	76,017	50,076	73,748	267,817	395,741
Beet sugar	25,500	4/	4/	4/	4/	4/	75,280	101,747
Confectionery products	31,149	35,959	4/	4/	4/	4/	35,494	40,472
Miscellaneous food preparations 5/	116,124	168,983	12,926	21,129	9,922	15,089	138,972	211,899
Other	71,892	101,649	14,507	29,648	48,165	94,078	52,315	101,540
Total value added 6/	1,067,757	1,473,442	287,244	400,912	261,626	402,005	1,616,627	2,276,359

1/ For some food groups, the total value added for the 3 areas does not equal that for the Western Region because of incomplete data.

2/ Adjusted value added.

3/ Excludes prepared animal feeds. Data on cereal preparations and flour mixes are available only for the Western Region.

4/ Data not available.

5/ Includes data for the following 4-digit industries: Cottonseed oil mills, macaroni and spaghetti, and food preparations not elsewhere classified.

6/ Total food and kindred products, excluding canned and cured seafoods, fresh or frozen packaged seafood, prepared animal feeds, beverages, manufactured ice, and grease and tallow.

The location of food processing industries is determined by many factors. Industries may be classified into two broad categories, market oriented or raw-materials oriented, depending on whether or not the location of markets or the location of raw materials is a more important determinant. 11/ For each industry, several factors are responsible for determining which classification it more nearly fits. Various costs of processing and transportation of raw materials and finished products as well as perishability and quality of product affect the orientation of the industry.

In industries that are market oriented it is advantageous to produce and process the raw material relatively near the source of consumption. Fluid milk and bread are examples of products that are in market-oriented industries. The quantity of these products processed in a region is closely related to the population. 12/ Market-oriented farm products are usually perishable or low in value relative to transportation costs.

Most of the other food manufacturing industries are either raw-materials oriented or a combination of market and raw-materials oriented. The processed fruit and vegetable industry is a good example of a raw-materials oriented industry. An important requirement for this industry is an abundant supply of uniformly high quality fruits and vegetables. Since fresh fruits and vegetables deteriorate rapidly after harvest, they are usually processed near the source of production. The products are generally culled and trimmed and lose weight in processing, which also favors location near areas of production.

The location of some food processing industries is affected considerably both by the location of markets and the location of raw materials. Thus, the location of meat packing is probably more raw-materials oriented and has moved closer to areas of production, where the combined costs of assembling and processing livestock are lower. The production of meat animals is widely scattered in some areas, however, and processing plants may locate at some concentration point which also is a market area. The growth of population in the West has been important in the growth of meat packing in the Western Region, although it primarily depends on the production of meat animals within the Region.

Among the industries that are more raw-materials oriented, the importance of fruit and vegetable processing stands out in California. In 1958, fruit and vegetable canning alone accounted for 22.4 percent of total value added by food processing in the State. In Washington-Oregon, fruit and vegetable canning with 16.6 percent of total value added, meat packing with 10.1 percent, and fruit and vegetable freezing with 10.1 percent are important industries that are more raw-materials than market oriented. In the Mountain States, meat packing is the important industry oriented towards raw materials, contributing 16.1 percent of value added.

Meat packing has increased in relative importance in the Mountain States and in Washington-Oregon in the postwar years, while in California fruit and vegetable processing has shown good gains.

11/ See Fuchs (8) for a discussion of this rather broad classification of markets with respect to all types of manufacturing. Among other things, he analyzed the effect of wage rates and labor intensity on the location of industry.

12/ In fact, in projecting the production of these commodities for the Western Region, it is assumed that production equals projected consumption.

Production and Consumption 13/

An important consideration to the western producer, processor, and distributor of food commodities is the growth in quantity produced or handled. Indexes of projected quantities consumed and produced and the surplus or deficit for each of the broad groups of commodities are given in table 2. The first six groups are processed commodities and correspond to the classification of food industries in the Census of Manufactures. 14/

In 1960-61, consumption exceeded production in the Western Region mainly in the meat and poultry, dairy, eggs, and flour and rice products groups. Consumption and production of bakery products were about in balance. Production exceeded consumption for fresh and processed fruits and vegetables, sugar and nuts.

Deficits in the Western Region in 1960-61 amounted to about 1.3 billion pounds of meat and poultry in retail weights, 2.1 billion pounds of whole milk equivalent (fat-solids basis), and 0.5 billion pounds of flour and rice products. 15/

Projections to 1985 indicate a deficit of about 3.6 billion pounds of meat and poultry, 3.1 billion pounds of dairy products, and 1.2 billion pounds of flour and rice products. 16/ The deficits in 1960-61 amounted to 26 percent of consumption for meat and poultry, 11 percent for dairy products, and 10 percent for flour and rice. The projected deficits in 1985 are 32 percent for meat and poultry, 11 percent for dairy products, and 15 percent for flour and rice.

The largest deficits in meat and poultry, 37 percent; dairy products, 18 percent; and flour and rice, 50 percent, occur in California. The deficits projected to 1985 amount to 54 percent, 18 percent, and 53 percent for these products, respectively. A surplus of rice exists in California, but it is more than offset by the deficit in flour.

In Washington-Oregon, the deficits in meat and poultry amounted to 28 percent and dairy products 1 percent in 1960-61. The projected deficits in 1985 are 25 percent for meat and poultry and 1 percent for dairy products. A surplus of 109 percent is shown for flour and rice. 17/ A surplus of 91 percent is projected for this group in 1985.

In the Mountain States there is a small surplus of meat and poultry, 6 percent; and flour and rice, 3 percent; and a small deficit of dairy products, 2 percent, in 1960-61. Projections to 1985 show a 22-percent surplus of meat production, a 4-percent surplus of flour and rice, and a 3-percent deficit of dairy products.

13/ Production and consumption figures are converted to retail weight equivalents. Production of a processed product is equal to the quantity processed. Thus, meat production refers to the quantity slaughtered rather than farm livestock production.

14/ The food processing industries shown in table 2 correspond to 3-digit Census industries. For instance, dairy products is a 3-digit Census industry composed of the following 4-digit industries: Creamery butter, natural cheese, concentrated milk, ice cream and frozen dairy products, special dairy products and fluid milk.

15/ These deficits are for product groups. For example, the Western Region has a surplus of rice and a deficit for flour products and for the total group of products.

16/ Any comparison in pounds of these product groups should consider the higher value per pound of the meat and poultry products.

17/ All of this surplus is in flour and flour products; no rice is produced in the area.

Table 2.--Food products: Production, consumption, production-consumption ratio, and surplus or deficit, California, Washington-Oregon, Mountain States, and Western Region, 1947-48, 1954-55, 1960-61 and projections by 5-year intervals, 1965-85 1/

Industry and year	California (1954-55=100) Consumption	California (1954-55=100) Production	California Prod.-cons. ratio	California Surplus or deficit	Washington-Oregon (1954-55=100) Consumption	Washington-Oregon (1954-55=100) Production	Washington-Oregon Prod.-cons. ratio	Washington-Oregon Surplus or deficit
	Pct.	Pct.	Pct.	Mil. lbs.	Pct.	Pct.	Pct.	Mil. lbs.
Meat and poultry:								
1947-48	74	68	66	-603	83	84	72	-172
1954-55	100	100	72	-684	100	100	72	-213
1960-61	130	113	63	-1,172	114	114	72	-239
1965	146	119	59	-1,467	128	126	71	-280
1970	172	134	56	-1,846	147	148	72	-312
1975	204	150	53	-2,347	168	171	73	-344
1980	243	168	50	-2,978	192	198	74	-379
1985	289	186	46	-3,785	220	230	75	-412
Dairy products: 2/								
1947-48	82	83	83	-1,252	91	97	106	162
1954-55	100	100	82	-1,594	100	100	99	-34
1960-61	118	117	82	-1,958	104	105	99	-20
1965	125	123	81	-2,157	112	110	98	-84
1970	135	134	81	-2,282	122	121	98	-81
1975	149	147	82	-2,456	130	129	98	-75
1980	164	163	82	-2,637	139	138	98	-70
1985	180	180	82	-2,851	150	149	99	-56
Processed fruits and vegetables: 3/								
1947-48	74	80	288	2,358	85	72	179	418
1954-55	100	100	269	2,836	100	100	211	688
1960-61	128	128	268	3,623	113	132	248	1,034
1965	145	139	258	3,858	127	153	254	1,217
1970	169	159	253	4,344	145	179	260	1,440
1975	199	183	247	4,931	164	207	267	1,698
1980	235	212	243	5,636	185	240	273	1,988
1985	277	245	237	6,410	209	278	281	2,347
Flour and rice:								
1947-48	79	72	51	-863	87	120	294	1,244
1954-55	100	100	56	-983	100	100	213	835
1960-61	122	110	50	-1,358	108	106	209	866
1965	132	118	50	-1,468	118	115	208	943
1970	145	127	49	-1,651	130	125	204	1,003
1975	154	141	51	-1,687	143	134	200	1,055
1980	183	156	48	-2,136	157	145	196	1,120
1985	206	174	47	-2,427	173	155	191	1,165
Bakery products: 4/								
1947-48	74	74	100	0	84	84	100	0
1954-55	100	100	100	0	100	100	100	0
1960-61	127	127	100	0	111	111	100	0
1965	141	141	100	0	125	125	100	0
1970	161	161	100	0	142	142	100	0
1975	187	187	100	0	160	160	100	0
1980	217	217	100	0	180	180	100	0
1985	252	252	100	0	203	203	100	0

Table 2.--Food products: Production, consumption, production-consumption ratio, and surplus or deficit, California, Washington-Oregon, Mountain States, and Western Region, 1947-48, 1954-55, 1960-61 and projections by 5-year intervals, 1965-85 1/--Continued

Industry and year	Mountain States (1954-55=100) Consumption	Mountain States (1954-55=100) Production	Mountain States Prod.-cons. ratio	Mountain States Surplus or deficit	Western Region (1954-55=100) Consumption	Western Region (1954-55=100) Production	Western Region Prod.-cons. ratio	Western Region Surplus or deficit
	Pct.	Pct.	Pct.	Mil. lbs.	Pct.	Pct.	Pct.	Mil. lbs.
Meat and poultry:								
1947-48	77	67	84	-118	76	71	72	-892
1954-55	100	100	97	-33	100	100	78	-930
1960-61	126	139	106	74	126	121	74	-1,337
1965	141	155	106	80	142	131	72	-1,666
1970	165	189	110	162	166	152	71	-1,995
1975	194	229	114	260	195	176	70	-2,431
1980	228	276	117	377	230	204	69	-2,980
1985	268	338	122	563	272	237	68	-3,634
Dairy products: 2/								
1947-48	84	88	108	305	84	87	94	-784
1954-55	100	100	104	167	100	100	91	-1,460
1960-61	117	110	98	-115	116	113	89	-2,093
1965	124	117	98	-128	122	118	88	-2,369
1970	135	127	97	-155	133	129	89	-2,519
1975	149	140	97	-179	145	141	89	-2,711
1980	164	154	97	-217	159	155	89	-2,925
1985	181	170	97	-244	175	171	89	-3,150
Processed fruits and vegetables: 3/								
1947-48	75	95	51	-198	77	78	209	2,578
1954-55	100	100	41	-319	100	100	206	3,205
1960-61	128	289	92	-56	125	134	222	4,601
1965	144	312	88	-90	141	149	218	4,985
1970	168	381	93	-68	163	172	217	5,716
1975	198	466	96	-37	191	200	216	6,592
1980	232	570	100	3	223	232	214	7,627
1985	255	703	113	174	258	271	216	8,931
Flour and rice:								
1947-48	82	107	158	482	81	101	127	864
1954-55	100	100	121	212	100	100	102	64
1960-61	119	102	103	39	119	106	90	-453
1965	127	112	107	87	128	115	91	-437
1970	139	123	107	99	141	125	90	-549
1975	155	135	106	91	152	137	91	-540
1980	172	149	105	83	175	150	87	-933
1985	191	164	104	69	196	164	85	-1,193
Bakery products: 4/								
1947-48	79	79	100	0	77	77	100	0
1954-55	100	100	100	0	100	100	100	0
1960-61	124	124	100	0	123	123	100	0
1965	137	137	100	0	137	137	100	0
1970	156	156	100	0	156	156	100	0
1975	179	179	100	0	180	180	100	0
1980	206	206	100	0	208	208	100	0
1985	237	237	100	0	239	239	100	0

Table 2.--Food products: Production, consumption, production-consumption ratio, and surplus or deficit, California, Washington-Oregon, Mountain States, and Western Region, 1947-48, 1954-55, 1960-61 and projections by 5-year intervals, 1965-85 1/--Continued

Industry and year	California				Washington-Oregon			
	(1954-55=100) Consumption	(1954-55=100) Production	Prod.-cons. ratio	Surplus or deficit	(1954-55=100) Consumption	(1954-55=100) Production	Prod.-cons. ratio	Surplus or deficit
	Pct.	Pct.	Pct.	Mil. lbs.	Pct.	Pct.	Pct.	Mil. lbs.
Beet sugar: 5/								
1947-48	77	70	80	-194	85	65	66	-119
1954-55	100	100	89	-143	100	100	86	-57
1960-61	125	106	75	-386	110	110	86	-63
1965	136	119	78	-375	122	124	88	-62
1970	151	133	78	-418	136	143	91	-53
1975	173	152	78	-476	152	165	94	-38
1980	196	173	78	-543	169	190	97	-22
1985	224	197	78	-618	188	220	101	5
Eggs:								
1947-48	84	55	54	-255	89	79	74	-50
1954-55	100	100	83	-115	100	100	84	-35
1960-61	116	136	97	-23	102	114	93	-15
1965	120	144	100	0	107	124	97	-7
1970	126	153	100	0	113	133	99	-2
1975	136	164	100	0	119	141	100	0
1980	146	177	100	0	125	148	100	0
1985	157	190	100	0	131	156	100	0
Fresh vegetables and tomatoes:								
1947-48	77	76	314	2,328	85	85	86	-64
1954-55	100	100	319	3,098	100	100	86	-76
1960-61	125	111	283	3,234	110	108	84	-96
1965	137	121	283	3,535	122	116	81	-123
1970	154	131	273	3,759	137	128	80	-145
1975	176	144	262	4,021	153	141	79	-173
1980	201	159	253	4,330	171	155	78	-204
1985	230	172	239	4,523	191	170	76	-244
Potatoes, fresh and processed:								
1947-48	76	98	237	1,335	84	84	323	774
1954-55	100	100	184	1,081	100	100	325	923
1960-61	126	120	175	1,221	111	128	375	1,257
1965	140	127	167	1,202	124	142	372	1,390
1970	160	140	161	1,257	140	166	384	1,641
1975	185	156	155	1,298	158	194	399	1,941
1980	215	174	149	1,353	178	225	411	2,271
1985	250	192	141	1,322	200	264	427	2,694
Fresh citrus fruit:								
1947-48	89	136	529	2,963	101	0	0	-242
1954-55	100	100	345	1,904	100	0	0	-240
1960-61	110	85	265	1,412	98	0	0	-234
1965	111	91	282	1,571	98	0	0	-234
1970	113	90	273	1,520	99	0	0	-237
1975	117	89	262	1,470	98	0	0	-236
1980	121	88	252	1,430	98	0	0	-236
1985	125	87	239	1,350	98	0	0	-236

Table 2.--Food products: Production, consumption, production-consumption ratio, and surplus or deficit, California, Washington-Oregon, Mountain States, and Western Region, 1947-48, 1954-55, 1960-61 and projections by 5-year intervals, 1965-85 1/--Continued

Industry and year	Mountain States				Western Region			
	(1954-55=100)		Prod.-cons. ratio	Surplus or deficit	(1954-55=100)		Prod.-cons. ratio	Surplus or deficit
	Consumption	Production			Consumption	Production		
	Pct.	Pct.	Pct.	Mil. lbs.	Pct.	Pct.	Pct.	Mil. lbs.
Beet sugar: 5/								
1947-48	80	110	347	1,112	79	89	145	798
1954-55	100	100	251	854	100	100	129	654
1960-61	122	131	270	1,168	121	119	127	719
1965	131	142	272	1,278	132	131	129	841
1970	147	164	281	1,501	147	150	131	1,030
1975	165	192	292	1,789	167	173	134	1,275
1980	186	223	300	2,112	189	200	137	1,547
1985	210	262	313	2,530	214	232	140	1,917
Eggs:								
1947-48	86	106	82	-45	85	70	65	-350
1954-55	100	100	66	-99	100	100	79	-249
1960-61	113	91	53	-156	113	122	85	-193
1965	116	94	54	-159	117	130	88	-166
1970	123	96	52	-173	123	137	88	-175
1975	130	99	50	-192	131	146	88	-192
1980	139	102	49	-210	140	155	87	-210
1985	148	104	47	-232	150	165	87	-232
Fresh vegetables and tomatoes:								
1947-48	80	126	269	876	79	86	252	3,142
1954-55	100	100	170	456	100	100	234	3,477
1960-61	122	142	199	779	121	116	224	3,917
1965	132	155	200	855	133	127	224	4,267
1970	148	169	194	907	149	138	217	4,522
1975	168	187	190	977	169	152	210	4,825
1980	190	208	186	1,064	192	168	204	5,191
1985	215	227	180	1,118	218	182	195	5,396
Potatoes, fresh and processed:								
1947-48	79	87	739	2,782	78	90	379	4,891
1954-55	100	100	668	3,130	100	100	329	5,134
1960-61	123	155	838	5,015	123	139	372	7,493
1965	135	171	847	5,561	136	152	367	8,154
1970	154	201	874	6,548	155	175	372	9,446
1975	176	238	906	7,809	178	204	377	11,048
1980	201	282	934	9,256	205	237	380	12,880
1985	231	336	972	11,113	236	277	385	15,129
Fresh citrus fruit:								
1947-48	93	95	50	-149	92	134	309	2,571
1954-55	100	100	49	-166	100	100	212	1,498
1960-61	108	139	62	-131	108	88	173	1,047
1965	108	120	54	-159	108	92	182	1,177
1970	110	119	52	-169	110	91	176	1,115
1975	113	117	50	-181	113	90	170	1,053
1980	116	115	48	-192	116	90	165	1,002
1985	118	112	46	-206	119	88	157	908

Table 2.--Food products: Production, consumption, production-consumption ratio, and surplus or deficit, California, Washington-Oregon, Mountain States, and Western Region, 1947-48, 1954-55, 1960-61 and projections by 5-year intervals, 1965-85 1/--Continued

Industry and year	California (1954-55=100) Consumption	California (1954-55=100) Production	California Prod.-cons. ratio	California Surplus or deficit	Washington-Oregon (1954-55=100) Consumption	Washington-Oregon (1954-55=100) Production	Washington-Oregon Prod.-cons. ratio	Washington-Oregon Surplus or deficit
	Pct.	Pct.	Pct.	Mil. lbs.	Pct.	Pct.	Pct.	Mil. lbs.
Fresh noneitrus fruit:								
1947-48	84	95	279	1,665	94	126	539	1,459
1954-55	100	100	247	1,628	100	100	399	1,063
1960-61	116	105	224	1,588	102	78	313	768
1965	119	109	226	1,658	106	85	321	834
1970	126	111	218	1,643	111	87	310	832
1975	135	114	209	1,626	116	87	298	816
1980	145	118	201	1,622	121	87	287	804
1985	155	120	191	1,559	126	86	272	771
Nuts (dried, shelled basis):								
1947-48	72	87	534	67	84	97	173	5
1954-55	100	100	440	73	100	100	150	4
1960-61	132	118	393	83	115	94	123	2
1965	154	140	400	100	134	112	125	3
1970	185	168	400	120	155	129	125	3
1975	224	204	400	145	178	148	125	4
1980	271	246	400	176	204	170	125	4
1985	328	298	400	213	234	195	125	5
	Mountain States				Western Region			
Fresh noncitrus fruit:								
1947-48	88	100	176	317	87	105	305	3,440
1954-55	100	100	155	261	100	100	253	2,952
1960-61	113	71	98	-11	112	92	208	2,345
1965	116	78	105	26	116	98	212	2,519
1970	122	80	101	7	122	99	205	2,482
1975	130	81	97	-18	130	101	196	2,425
1980	137	83	94	-42	139	104	189	2,384
1985	146	83	89	-79	148	105	179	2,251
Nuts (dried, shelled basis):								
1947-48	54	0	0	-5	70	88	352	68
1954-55	100	0	0	-9	100	100	280	69
1960-61	98	0	0	-8	120	115	267	77
1965	114	0	0	-10	141	138	275	92
1970	138	0	0	-11	168	165	275	111
1975	167	0	0	-14	202	198	275	134
1980	204	0	0	-18	242	238	276	162
1985	248	0	0	-21	290	287	277	196

1/ All data based on pounds of food in retail weights except as indicated. Production is factory production for the first six food groups and farm production in retail weights for the remaining food groups.

2/ Data for dairy products based on whole milk equivalents.

3/ The only breakdown of factory production of processed fruits and vegetables available by area is California, Northwest and other West. Consequently, for this industry production and consumption in Idaho and Montana are included in the data for Washington-Oregon

4/ Indexes for bakery products are based on estimates of expenditures (in 1954 dollars) for these foods.

5/ Consumption includes beet and cane sugar; production includes beet sugar only.

Because of the nature of the bakery products group and the lack of production data, it was assumed that production equaled consumption. This balance for both the postwar and projected years was assumed for each area in the Western Region (table 2).

The production-consumption balance for eggs in the Western Region shows a decreasing deficit in production since 1947. The deficit was 15 percent of consumption in 1960-61 and is projected to be about 13 percent in 1985.

In California and Washington-Oregon, the deficit has declined since 1947. Production and consumption are expected to come into balance during the projected years. (Poultry specialists indicate that California has had a small surplus of egg production in recent years.) In the Mountain States, the deficit in egg production increased from 18 percent of consumption in 1947-48 to 47 percent in 1960-61. For the projected years the deficit is expected to be about 50 percent of consumption.

It is significant that the food commodities in which the Western Region has a considerable surplus of production, except for beet sugar, are in the fruit, vegetable, and nut groups (table 2). The climate in the Western Region is favorable to the production of large surpluses of these commodities. Since large quantities of water are required in the production of sugarbeets, extensive irrigation has favored their increased production.

Differences will occur in the production and consumption patterns within the Region. Production of processed fruits and vegetables is larger in California than in the rest of the Region. Despite its projected increase in surplus production for 1985, production as a percentage of consumption is expected to decline from 268 percent in 1960-61 to 237 percent in 1985. The Pacific Northwest States, which include Idaho and Montana for this particular group of industries, are expected to produce larger surpluses of processed fruits and vegetables by 1985, although the projected surplus is much smaller than that in California. Production will increase faster than consumption, rising from 248 percent of consumption in 1960-61 to 281 percent in 1985. The remaining Mountain States showed a small deficit in production of processed fruits and vegetables in 1947-61, but a small surplus is projected by 1985.

California is also a heavy producer of fresh vegetables, including tomatoes, with the surplus projected to increase to 1985. However, production is projected to increase at a slower rate than consumption. Thus, the production-consumption ratio will decrease from 283 percent of consumption in 1960-61 to 239 percent of consumption in 1985. Washington-Oregon consumes more fresh vegetables and tomatoes than it produces. Consumption is expected to increase faster than production, reducing the production-consumption ratio from 84 percent in 1960-61 to 76 percent in 1985. The Mountain States produce more fresh vegetables and tomatoes than they consume. The surplus is expected to increase to 1985.

California produces a surplus of fresh citrus fruits. Although the production surplus is projected to change little from 1960-61, the production-consumption ratio will decline from 265 percent of consumption to 239 percent in 1985. Washington-Oregon produces no citrus and the deficit is projected to remain about the same. In the Mountain States, only Arizona produces fresh citrus. Consumption exceeds production in the Mountain States and the deficit is expected to increase to 1985.

California is a large producer of fresh noncitrus fruits with a surplus of 1.6 billion pounds in 1960-61. Projections indicate that production will increase but

that the surplus will change very little from 1960-61 to 1985. The production of fresh noncitrus fruits projected for Washington-Oregon by the method used for this study is about 13 percent smaller than that in 1954-55, but about 12 percent larger than production in 1960-61 (table 2). However, data obtained from a census of fruit trees in Washington indicate that production in that State, at least, may well exceed the production projected in this study. Hence, the projected surplus of about 0.8 billion pounds for Washington-Oregon may be too small. In the Mountain States, production and consumption was about in balance in 1960-61, but a small deficit is projected by 1985.

The Western Region produces a large surplus of potatoes--about 7.5 billion pounds in 1960-61. Production amounted to 372 percent of consumption in 1960-61 and is projected to increase to 385 percent of consumption in 1985. The Mountain States produced about two-thirds of the surplus of potatoes in the Western Region in 1960-61. Production there was about 840 percent of consumption in 1960-61 and is projected to about 970 percent in 1985. The remaining third of the surplus was about evenly divided between California and Washington. The surplus production in California is projected to increase about 8 percent by 1985. In Washington-Oregon the surplus is projected to more than double by 1985.

The Western Region is a large producer of nuts. California produces a large surplus, with production equal to about 400 percent of consumption in 1960-61. Washington-Oregon produces a smaller surplus, with production equal to about 125 percent of consumption in 1960-61. No commercial production of nuts takes place in the Mountain States, except for some pecan production in New Mexico.

The Western Region also produces more than enough beet sugar to satisfy total sugar consumption with production equal to 127 percent of consumption in 1960-61. Production in California and Washington-Oregon is less than consumption, and the deficit in California will be somewhat larger in 1985. Production of beet sugar in Washington-Oregon is projected to increase faster than consumption, resulting in a small surplus production in 1985. Production of beet sugar in the Mountain States was 270 percent of consumption in 1960-61 and is projected to increase to 313 percent of consumption by 1985.

From the foregoing, production-consumption balances for the various commodities are seen to vary among the different areas in the Western Region. Because of the importance of California, principally in consumption, but also in production, surpluses and deficits in production of food products for the Region generally occur in the same product groups as for California.

PRODUCTIVITY, EMPLOYMENT, AND SIZE OF ESTABLISHMENTS IN FOOD PROCESSING

Productivity in Food Processing

To obtain projections of employment in food processing, a projection of the long-run increase in productivity is required. A major problem in projecting productivity is determining the quantity of food processing that is done. One measure of the quantity is the actual pounds of physical product moving through the plant. However, with the increased processing per unit of physical product which has occurred, this measure may understate the quantity of processing.

Another measure of the quantity of processing is value added in manufacturing deflated for price change. 18/ This would be an unduplicated measure of output and would reflect only the contributions of the food manufacturers. However, since a price index of value added is not available, it was necessary to deflate value of shipments and cost of materials, supplies, etc., by the appropriate price indexes. 19/

The index of output per man-hour used in this study was obtained by dividing the index of the physical quantity of product by the index of man-hours of employment in each industry (table 3).

This procedure has the following weaknesses: (1) Employment figures are from the Census of Manufactures while physical production figures are largely derived from estimates of production made by the Economic Research Service; and (2) these physical quantity figures underestimate the true factory production. Consequently, the productivity indexes in table 3 were used as a guide only in estimating the rate of increase in productivity. These figures and productivity changes in food processing in the United States as a whole were used to estimate the increase in productivity per year shown in table 4. These productivity increases were used to project employment in the food processing industries.

While several factors have contributed to the growth in output per man-hour in food processing, new technology is probably the most important, particularly since World War II. Developments in materials handling, continuous processes, packaging, and other jobs have increased output per man-hour in food processing. In materials handling, the trend has been toward pallet loads and all types of bulk handling. Continuous-type processes have replaced many of the batch-type operations. Electronic- and computer-controlled operations have automated the continuous operations considerably. Increased use of electric power-driven equipment in conveyors, bulk-handling equipment, and continuous-production processes have also contributed to increases in productivity. 20/

Hourly Earnings and Unit Labor Costs in Processing

Earnings of all employees in food processing establishments in the West showed large gains from 1947 to 1958 (table 5). Increases in average hourly earnings ranged from about 60 percent for processed fruits and vegetables to 90 percent for dairy products. In general, the trend in hourly earnings was about the same in the Mountain and Pacific Regions. However, the hourly earings in the Pacific Region averaged about 17 percent higher than in the Mountain Region in 1958.

From 1947 to 1958, unit labor costs increased for 5 of the 6 groups of food processing industries for which data were available (table 5). 21/ Increases in earnings were larger than the increases in productivity. The largest increases in

18/ Value added by manufacture is equal to value of shipments less the cost of materials, supplies, fuel, purchased electric energy, and contract work.

19/ Value added in constant prices was tried in this study in order to obtain an estimate of change in productivity. Problems were encountered in this procedure and unreasonable results were obtained for some industries. Lack of adequate price deflators is believed to be the main problem. The price deflators were price indexes which may not adequately reflect changes in prices for the Western Region.

20/ For more detailed discussion of the factors affecting labor productivity, see Waldorf (20, pp. 14-18).

21/ Unit labor cost is defined as average hourly earnings divided by an index of labor productivity.

Table 3.--Food processing industries: Indexes of man-hours, factory production, and labor productivity, Mountain States, Pacific States, and Western Region, 1947, 1954, and 1958

(1954 = 100)

Industry 1/ and year	Mountain States			Pacific States			Western Region		
	Man-hours	Factory production	Labor productivity 2/	Man-hours	Factory production	Labor productivity 2/	Man-hours	Factory production	Labor productivity 2/
Meat and poultry packing:									
1947	84	73	88	81	78	95	82	76	93
1954	100	100	100	100	100	100	100	100	100
1958	101	115	115	91	101	111	93	105	112
Dairy products: 3/									
1947	151	91	60	152	95	62	145	93	64
1954	100	100	100	100	100	100	100	100	100
1958	84	98	116	87	93	107	86	95	110
Processed fruits and vegetables:									
1947	4/	4/	4/	4/	4/	4/	109	90	83
1954	4/	4/	4/	100	100	100	100	100	100
1958	4/	4/	4/	111	125	112	112	129	116
Grain mill products:									
1947	115	108	94	109	105	96	111	106	96
1954	100	100	100	100	100	100	100	100	100
1958	89	101	113	90	107	118	90	105	117
Bakery products:									
1947	4/	4/	4/	4/	4/	4/	90	79	88
1954	100	100	100	100	100	100	100	100	100
1958	112	117	104	106	115	109	107	116	108
Beet sugar:									
1947	4/	4/	4/	4/	4/	4/	127	78	62
1954	4/	4/	4/	4/	4/	4/	100	100	100
1958	4/	4/	4/	4/	4/	4/	98	117	119

1/ Data are not available for industries manufacturing candy and confectionery products, and miscellaneous food preparations.
2/ Factory production divided by man-hours.
3/ Excludes fluid milk due to lack of data.
4/ Data not available.

Table 4.--Food processing industries: Estimated average annual increases in productivity used to project employment in food processing in the Western Region

Industry	Productivity increase per year 1/
	Percent
Meat packing and prepared meats	3
Poultry dressing	4
Creamery butter	2/3
Natural cheese	2/3
Processed milk	2/3
Ice cream and ices	2/3
Fluid milk and cream	2/3
Canned fruits and vegetables	3
Pickles and sauces	3
Frozen fruits and vegetables	4
Flour, meal and flour mixes	2
Rice milling	2
Beet sugar	3
Bread and related products	2/2
Biscuits and crackers	2/2

1/ Based on the productivity indexes in table 3 and changes in productivity in corresponding industries for the United States. For changes in productivity in the United States, see Waldorf (21).

2/ Based on the productivity increase in the United States between 1947 and 1958 for the corresponding industries as determined by Waldorf (21).

unit labor costs from 1947 to 1958 were in meat packing, 50 percent; grain-mill products, 57 percent; and bakery products, 47 percent. The increase in unit labor costs was 10 percent for dairy products and 13 percent for processed fruits and vegetables. 22/ Only the beet sugar industry showed a decrease in unit labor costs with a decline of 11 percent.

Number and Size of Establishments

The trend toward fewer but larger processing plants has been quite pronounced in the West from 1947 to 1958 (table 6). The dairy products, grain-mill products, and confectionery products industry groups showed large declines in number of plants. Bakery products and beet sugar showed moderate declines. Large increases in number of plants occurred in the meat packing, processed fruits and vegetables, and miscellaneous food preparations industry groups.

Average size of plants, as measured by value of shipments in constant dollars per plant, increased in every industry from 1947 to 1958. Average size of plant about doubled in the processed fruits and vegetables group and increased almost 70 percent in the grain-mill products group.

Among the individual industries, the largest increases in average size of plant occurred in poultry dressing, creamery butter, canned fruits and vegetables,

22/ These increases in unit labor costs are too high to the extent that the productivity indexes understate the actual increase in productivity. See the previous section on productivity in food processing for a discussion of this point.

Table 5.--Food processing industries: Indexes of average hourly earnings, labor productivity and unit labor costs, Mountain States, Pacific States, and Western Region, 1947, 1954, and 1958

(1954 = 100)

Industry 1/ and year	Mountain States			Pacific States			Western Region		
	Average hourly earnings	Productivity	Unit labor costs 2/	Average hourly earnings	Productivity	Unit labor costs 2/	Average hourly earnings	Productivity	Unit labor costs 2/
Meat and poultry packing:									
1947	68	88	78	69	95	72	69	93	74
1954	100	100	100	100	100	100	100	100	100
1958	126	115	110	125	111	113	125	112	111
Dairy products:									
1947	62	60	103	65	62	105	64	64	100
1954	100	100	100	100	100	100	100	100	100
1958	114	116	98	124	107	116	122	110	110
Processed fruits and vegetables:									
1947	3/	3/	3/	3/	3/	3/	75	83	90
1954	3/	3/	3/	100	100	100	100	100	100
1958	3/	3/	3/	117	112	104	117	116	102
Grain mill products: 4/									
1947	72	82	88	74	83	89	71	83	86
1954	100	100	100	100	100	100	100	100	100
1958	118	111	106	127	101	126	126	105	120
Bakery products:									
1947	3/	3/	3/	3/	3/	3/	68	88	77
1954	100	100	100	100	100	100	100	100	100
1958	118	104	114	123	109	113	122	108	113
Beet sugar:									
1947	3/	3/	3/	3/	3/	3/	67	62	108
1954	3/	3/	3/	3/	3/	3/	100	100	100
1958	3/	3/	3/	3/	3/	3/	115	119	96

1/ Data are not available for industries manufacturing candy and confectionery products, and miscellaneous food preparations.

2/ Average hourly earnings divided by productivity index.

3/ Data not available.

4/ Excludes prepared animal feeds.

Table 6.--Food processing industries: Number of establishments, value of shipments and employment per establishment, Mountain States, Pacific States and Western Region, 1947, 1954, and 1958

Industry and year	Mountain States				
	Establishments	Value of shipments		Employment	
		Total	Per establishment	Total	Per establishment
	Number	Thous. dol.	Thous. dol.	Number	Number
Meat and poultry products:					
1947	192	1/	1/	6,951	36
1954	217	397,114	1,830	8,304	38
1958	255	517,935	2,031	8,610	34
Dairy products:					
1947	2/	2/	2/	2/	2/
1954	191	104,706	548	3,164	17
1958	118	94,232	799	2,086	18
Processed fruits and vegetables:					
1947	2/	2/	2/	2/	2/
1954	84	36,119	430	3,420	41
1958	95	57,065	601	3,950	42
Grain mill products: 3/					
1947	73	128,757	1,764	2,109	29
1954	49	103,005	2,102	1,734	35
1958	43	114,506	2,663	1,622	38
Bakery products:					
1947	2/	2/	2/	2/	2/
1954	287	97,839	341	7,290	25
1958	275	119,477	434	8.344	30
Beet sugar:					
1947	1/	1/	1/	1/	1/
1954	1/	1/	1/	1/	1/
1958	1/	1/	1/	1/	1/
Candy and related products:					
1947	1/	1/	1/	1/	1/
1954	1/	1/	1/	1/	1/
1958	1/	1/	1/	1/	1/
Miscellaneous food preparations: 4/					
1947	91	24,190	266	920	10
1954	111	24,318	219	1,731	16
1958	136	44,602	328	2,037	15

Table 6.--Food processing industries: Number of establishments, value of shipments and employment per establishment, Mountain States, Pacific States and Western Region, 1947, 1954, and 1958--Continued

Industry and year	Pacific States				
	Establishments	Value of shipments		Employment	
		Total	Per establishment	Total	Per establishment
	Number	Thous. dol.	Thous. dol.	Number	Number
Meat and poultry products:					
1947	427	1/	1/	18,541	43
1954	595	1,192,176	2,004	24,092	40
1958	568	1,281,854	2,257	22,248	39
Dairy products:					
1947	2/	2/	2/	2/	2/
1954	303	209,176	690	6,283	21
1958	229	207,983	908	5,077	22
Processed fruits and vegetables:					
1947	2/	2/	2/	2/	2/
1954	519	972,935	1,875	43,218	83
1958	541	1,275,918	2,358	49,873	92
Grain mill products: 3/					
1947	57	264,909	4,648	3,801	67
1954	48	247,397	5,154	3,247	68
1958	55	260,611	4,738	3,456	63
Bakery products:					
1947	2/	2/	2/	2/	2/
1954	600	403,106	672	27,325	46
1958	575	489,686	852	29,527	51
Beet sugar:					
1947	1/	1/	1/	1/	1/
1954	1/	1/	1/	1/	1/
1958	1/	1/	1/	1/	1/
Candy and related products:					
1947	1/	1/	1/	1/	1/
1954	1/	1/	1/	1/	1/
1958	1/	1/	1/	1/	1/
Miscellaneous food preparations: 4/					
1947	235	372,593	1,586	5,972	25
1954	371	447,718	1,207	8,244	22
1958	391	647,251	1,655	10,814	28

Table 6.--Food processing industries: Number of establishments, value of shipments and employment per establishment, Mountain States, Pacific States and Western Region, 1947, 1954, and 1958--Continued

Industry and year	Western Region				
	Establishments	Value of shipments		Employment	
		Total	Per establishment	Total	Per establishment
	Number	Thous. dol.	Thous. dol.	Number	Number
Meat and poultry products:					
1947	619	1/	1/	25,492	41
1954	812	1,589,290	1,957	32,396	40
1958	823	1,799,789	2,187	30,858	37
Dairy products:					
1947	653	377,865	579	12,616	19
1954	494	313,882	635	9,447	19
1958	347	302,216	871	7,163	21
Processed fruits and vegetables:					
1947	630	679,748	1,079	49,171	78
1954	603	1,009,054	1,673	46,638	77
1958	636	1,332,981	2,096	53,823	85
Grain mill products: 3/					
1947	166	409,154	2,465	6,422	39
1954	143	409,955	2,867	6,220	43
1958	128	452,863	3,538	6,322	49
Bakery products:					
1947	905	425,059	470	29,591	33
1954	887	500,945	565	34,615	39
1958	850	609,162	717	37,871	45
Beet sugar:					
1947	50	214,252	4,285	9,967	199
1954	47	233,913	4,977	8,476	180
1958	46	280,220	6,092	7,781	169
Candy and related products:					
1947	197	87,099	442	6,206	32
1954	181	85,056	470	5,737	32
1958	168	99,459	592	5,873	35
Miscellaneous food preparations: 4/					
1947	419	511,451	1,221	8,709	21
1954	597	718,971	1,204	13,537	23
1958	638	986,981	1,547	17,185	27

1/ Data not available.
2/ Data are incomplete.
3/ Excludes prepared animal feeds; totals for Mountain and Pacific States do not include cereal preparations and flour mixes.
4/ Totals for Mountain and Pacific States only for plants manufacturing preparations not elsewhere classified (SIC 2099).

pickles and sauces, frozen fruits and vegetables, cereal preparations, flour mixes, biscuits and crackers, and shortening and cooking oils. Size of plants in these industries increased 100 percent or more between 1947 and 1958.

Incentives for increasing the size of plants come from various sources. (1) Lower costs of production in large plants using more capital in relation to labor has spurred larger plant sizes. (2) The favorable competitive position and expansion of food processing in the West has made it practicable to increase capacity by building large modern plants. (3) New technologies and increased mechanization have made it possible to increase capacity of existing plants.

Because of increases in labor productivity, increases in employment per plant were appreciably smaller than increases in size of plant. Decreases in employment per plant occurred in meat packing and beet sugar processing.

Projected Labor Requirements in Processing

Labor requirements in food processing were based on the projected change in factory production and in productivity (tables 4 and 7). Employment was first projected for the smaller 4-digit Census industries and then combined into 3-digit industries where possible. 23/

Employment in the West for all major food processing industries except bakery products is projected to decline or remain at about the 1954 level by 1985. For the bakery products industry, employment is projected to increase 35 percent during this period. Employment in the dairy products industries is projected to decline the most--to about 82 percent of the 1954 level.

Because of the varying projected changes in factory processing, employment in meat and poultry processing is expected to increase about 40 percent in the Mountain States, to decrease 11 percent in the Washington-Oregon, and to decrease 25 percent in California from 1954 to 1985.

Since labor productivity is projected to increase faster than output of dairy products, employment in the dairy products industry is expected to be uniformly downward. Employment in this industry is projected to drop 11 percent in the Mountain States, 14 percent in California, and 32 percent in Washington-Oregon.

Large increases in projected production of processed fruits and vegetables are more than matched by larger than average increases in productivity. This results in a small decrease in employment in California and increases in Washington-Oregon and the Mountain States. 24/

Employment in the flour- and rice-milling industry in California is projected to increase about 30 percent from 1954 to 1985. Because of the large jump in employment between 1954 and 1958, this is about the same level of employment as in 1958. Flour-milling employment is projected to drop about 30 percent in Washington-Oregon and 10 percent in the Mountain States.

23/ See footnote 14, p.7, for a brief description of the makeup of 3- and 4-digit industries.

24/ Projected increases in the output of processed potato products partly account for the large increases in output of processed fruits and vegetables in the Mountain States and Washington-Oregon.

Table 7.--Food processing industries: Indexes of factory production and employment, California, Washington-Oregon, Mountain States, and Western Region, 1947, 1954, 1958 and projections by 5-year intervals, 1970-85

(1954 = 100)

Industry and year	California		Washington-Oregon		Mountain States		Western Region	
	Factory production 1/	Employment 2/	Factory production 1/	Employment 2/	Factory production 1/	Employment 2/	Factory production 1/	Employment 2/
Meat packing and poultry dressing:								
1947	73	75	92	82	73	84	76	78
1954	100	100	100	100	100	100	100	100
1958	101	93	102	90	115	104	105	95
1970	138	87	154	92	196	124	157	98
1975	155	84	179	91	238	129	183	97
1980	173	80	207	90	287	134	212	96
1985	192	75	240	89	351	140	246	95
Dairy products: 3/								
1947	84	119	98	141	88	137	88	127
1954	100	100	100	100	100	100	100	100
1958	106	110	99	102	104	118	104	110
1970	134	97	119	86	127	102	129	96
1975	148	93	127	79	140	97	141	91
1980	164	89	137	73	153	93	155	86
1985	181	86	148	68	169	89	171	82
Processed fruits and vegetables: 4/								
1947	95	88	77	120	126	121	90	96
1954	100	100	100	100	100	100	100	100
1958	126	116	123	107	195	156	129	116
1970	178	114	216	126	444	183	97	120
1975	204	113	251	124	544	184	229	119
1980	236	112	291	122	664	185	266	118
1985	272	110	338	120	820	186	310	117
Flour and rice milling:								
1947	76	80	129	122	108	120	106	107
1954	100	100	100	100	100	100	100	100
1958	95	129	116	87	101	94	105	104
1970	128	132	127	74	122	90	126	99
1975	142	131	136	73	134	90	137	98
1980	156	131	147	71	148	89	150	97
1985	176	130	157	69	162	89	165	96

Table 7.--Food processing industries: Indexes of factory production and employment, California, Washington-Oregon, Mountain States, and Western Region, 1947, 1954, 1958 and projections by 5-year intervals, 1970-85--Continued

(1954 = 100)

Industry and year	California		Washington-Oregon		Mountain States		Western Region	
	Factory production 1/	Employment 2/	Factory production 1/	Employment 2/	Factory production 1/	Employment 2/	Factory production 1/	Employment 2/
Bakery products:								
1947	77	80	85	100	79	93	79	86
1954	100	100	100	100	100	100	100	100
1958	118	110	108	100	117	114	116	109
1970	165	122	144	106	160	124	160	119
1975	192	129	163	108	184	129	184	125
1980	222	135	184	110	211	134	212	130
1985	258	142	207	112	243	139	245	135
Beet sugar:								
1947	66	92	59	5/86	91	5/140	78	118
1954	100	100	100	5/100	100	5/100	100	100
1958	110	91	115	5/83	123	5/94	117	92
1970	146	84	150	76	161	86	154	85
1975	166	83	173	75	189	87	178	84
1980	189	82	199	75	219	88	206	84
1985	215	80	231	75	258	89	239	84

1/ Derivations of factory production indexes for processed fruits and vegetables are based on pack statistics in the Western Canner and Packer; for the other industries on data of U. S. Department of Agriculture. The production indexes are based on retail equivalent weights. They differ from those shown in table 2 only because of the difference in the base period.

2/ Employment indexes for 1947, 1954, and 1958 are based on data in the Census of Manufacturers.

3/ Dairy products in terms of whole milk equivalents.

4/ The only breakdown of factory production of processed fruits and vegetables available by areas is California, Northwest, and other West. Consequently for this industry, factory production and employment in Idaho and Montana are included in the data for Washington-Oregon and excluded from Mountain States.

5/ Employment for the Western Region except California was allocated to Washington-Oregon and Mountain States on the basis of factory production of beet sugar in each area.

Employment in the bread and related industries is projected to increase 42 percent in California, 12 percent in Washington-Oregon, and 39 percent in the Mountain States from 1954 to 1985. Decreases in employment in the beet sugar industry are projected for all three areas during this period.

WHOLESALING

The wholesaling step in marketing farm products includes the handling of commodities between the farmer or food processor and the retailer. Some shift in importance of various types of wholesalers has taken place in recent years and some wholesaling activity has been integrated into retailing and processing.

Data on wholesaling are classified into two broad categories depending on the types of products handled. These two categories are: (1) Groceries and related products and edible farm products, and (2) farm products, raw materials. The data given for wholesaling include all types of wholesalers--merchant wholesalers, agents and brokers, assemblers, manufacturer's sales branches, and assemblers of farm products.

To minimize the effect of price changes in an attempt to get a measure of the changes in physical volume of wholesaling activity, wholesale sales were adjusted by U.S. average wholesale price indexes. 25/ The "processed foods" wholesale price index was used to deflate sales of groceries and edible farm products, and the "farm products" wholesale price index was used to deflate the farm products, raw materials category of wholesaling.

The U.S. wholesale price indexes probably failed to remove some of the movement in the wholesale sales data due to price changes alone, since the mix of commodities wholesaled in the United States may not be representative of those in the Western Region. This problem seems to be relatively minor for the groceries and edible farm products, but relatively more important for the farm products, raw materials. For a given year, this price effect might be rather important in the raw materials category. However, for the 3 census years covered, the use of deflated sales should give a fair indication of changes in wholesaling activity, exclusive of price changes.

To project total deflated sales in each area of the Western Region, the index of deflated sales was related to an index of total food marketed in the 3 census years. 26/ This relationship was then used to project deflated wholesale sales. By relating deflated sales to employment for these years, a measure of change in labor productivity was obtained. This labor productivity index was projected and divided into deflated sales to give projected employment figures (table 8).

Deflated Sales

For the West, deflated sales in wholesaling groceries and edible farm products are projected to increase about 180 percent from 1954 to 1985. Population growth is one factor which affects the amount of food wholesaled. The differential rates of population growth are reflected in the projected increase in deflated wholesale

25/ U.S. indexes were used, since regional price indexes were not available.
26/ The index of total food marketed was obtained by totaling the production of the various food commodities shown in table 2.

Table 8.--Wholesaling farm products: Indexes of deflated sales and employment, California, Washington-Oregon, Mountain States, and Western Region, 1948, 1954, 1958 and projections by 5-year intervals, 1970-85

(1954 = 100)

Type of product and year	California		Washington-Oregon		Mountain States		Western Region	
	Deflated sales 1/	Employment	Deflated sales 1/	Employment	Deflated sales 1/	Employment	Deflated sales 1/	Employment
Groceries and edible farm products:								
1948	67	94	81	116	75	89	70	98
1954	100	100	100	100	100	100	100	100
1958	115	106	111	89	123	103	115	102
1970	178	135	151	115	190	144	175	133
1975	209	143	170	117	230	158	205	141
1980	245	154	192	120	278	174	240	151
1985	286	165	218	126	336	194	281	163
Farm products raw materials:								
1948	64	24	81	63	80	88	75	56
1954	100	100	100	100	100	100	100	100
1958	108	60	165	112	107	98	118	84
1970	172	77	190	126	161	129	170	115
1975	199	82	227	141	189	142	200	122
1980	231	87	270	158	223	158	235	131
1985	266	93	320	178	263	177	275	143
Total groceries and farm products:								
1948	66	87	81	109	78	89	72	92
1954	100	100	100	100	100	100	100	100
1958	114	101	125	92	115	101	116	99
1970	177	131	162	116	175	140	174	130
1975	208	138	185	120	209	154	204	138
1980	243	148	212	125	250	170	239	148
1985	283	158	245	132	299	190	280	160

1/ Sales of wholesalers from the Censuses of Business 1948, 1954 and 1958 were deflated by U.S. wholesale price indexes. Sales of groceries and edible farm products were deflated by the processed foods price index and farm products, raw materials by the farm products price index.

food sales of about 185 percent in California, 120 percent in Washington-Oregon, and 235 percent in the Mountain States.

Wholesaling of raw-material farm products is less directly related to changes in population, since less of the wholesaling activity is directed toward consumption entirely within the Region. Projected increases in deflated sales of these products are 220 percent for Washington-Oregon and about 165 percent for both California and the Mountain States.

The relative importance of the above two wholesale categories varies according to the area considered in the West. In California, groceries and edible farm products accounted for about 88 percent of total wholesaling of farm products in 1958. In Washington-Oregon, this category accounted for about 65 percent of total wholesaling of farm products and in the Mountain States only a little more than 50 percent. Wholesaling of groceries and edible farm products assumes more importance in those areas with a larger population relative to farm production.

Total wholesaling of groceries and farm products is a sum of the above two categories of wholesaling. For total wholesaling of farm products, deflated sales are projected to increase by 183 percent for California, 145 percent for Washington-Oregon, 199 percent for the Mountain States, and 180 percent for the total Western Region.

Employment

Employment in the wholesaling of food and farm products is expected to increase much more slowly than sales (deflated) because of the projected increases in sales per employee.

In wholesaling groceries and edible farm products, employment is projected to increase 65 percent for California, 26 percent for Washington-Oregon, 94 percent for the Mountain States, and 63 percent for the entire Western Region from 1954 to 1985. For the farm products, raw materials group, the projected changes in employment are a 78-percent increase in Washington-Oregon, a 77-percent increase in the Mountain States, a 2-percent decrease in California, and a 43-percent increase in the West from 1954 to 1985. The 2-percent decrease for California is largely the result of a bulge in employment in 1954. Reported employment in these establishments in 1954 was more than 4 times larger than in 1948 and 67 percent larger than in 1958. The projected employment in California in 1985 is 55 percent larger than in 1958. This increase is about as large as that of Washington-Oregon. For total wholesaling, the projected increase in employment for the same years is 90 percent for the Mountain States, 58 percent for California, 32 percent for Washington-Oregon, and 60 percent for the total Western Region.

Earnings and Unit Labor Costs

Earnings of employees in wholesale food and farm products establishments increased more than 50 percent from 1948 to 1958 in the Western Region (table 9). This increase in weekly earnings was fairly uniform for the different kinds of wholesaling in the three areas. Increases were fairly uniform even though the actual level of wages varied among the areas of the West. In 1958, average weekly earnings for total food wholesalers in the three areas shown were: $91 for California, $84

Table 9.--Wholesaling farm products: Indexes of average weekly earnings and unit labor costs, California, Washington-Oregon, Mountain States, and Western Region, 1948, 1954, and 1958

(1954 = 100)

Type of product and year	California		Washington-Oregon	
	Avg. weekly earnings	Unit labor costs 1/	Avg. weekly earnings	Unit labor costs 1/
Groceries and edible farm products:				
1948	76	106	83	104
1954	100	100	100	100
1958	117	97	122	96
Farm products, raw materials:				
1948	83	50	86	71
1954	100	100	100	100
1958	108	76	122	72
Total groceries and farm products:				
1948	76	103	83	100
1954	100	100	100	100
1958	117	96	122	87

	Mountain States		Western Region	
Groceries and edible farm products:				
1948	77	93	77	104
1954	100	100	100	100
1958	120	90	118	96
Farm products, raw materials:				
1948	79	107	76	76
1954	100	100	100	100
1958	119	120	113	91
Total groceries and farm products:				
1948	78	94	78	100
1954	100	100	100	100
1958	121	100	118	95

1/ Unit labor costs = annual payroll ÷ annual deflated sales.

for Washington-Oregon, $78 for the Mountain States, and $87 for the total Western Region.

Increases in labor productivity in wholesaling, as measured by deflated sales per employee were large enough to result in decreases in unit labor costs for groceries and edible food products for each of the areas shown. Variations in unit labor costs for farm products, raw materials were larger; and it was more difficult to discern trends. However, for the total Western Region, unit labor costs for the farm products, raw materials increased from 1948 to 1958.

Number and Size of Establishments

The number of wholesale establishments handling groceries and farm products increased 15 percent between 1948 and 1958, and the average volume per establishment increased 40 percent, bringing the total volume increase to 60 percent (table 10).

The percentage increase in number of establishments in each area of the Western Region was not far from the 16-percent increase for the Region between 1948 and 1958. The increase in the average size of establishment in the Region varied from 45 percent in California, to 35 percent in Washington-Oregon, to 31 percent in the Mountain States.

RETAILING

Two types of food retailing were considered--food stores and eating places. Food stores include grocery stores and specialized types of food stores, including meat markets; fruit and vegetable stores; retail bakeries; candy, nut, and confectionery; egg and poultry; and other types. Eating places include restaurants, cafeterias, refreshment stands, and other eating places.

In the food stores category, grocery stores account for the major share of total deflated sales. In 1958, grocery stores, which sell a wide range of commodities, accounted for 90 percent of total food store sales in California, 93 percent in Washington-Oregon, almost 95 percent in the Mountain States, and an average of 92 percent in the Western Region. The rest of the volume was accounted for by the specialized stores. In the Western Region, meat markets, retail bakeries, and fruit and vegetable markets are the most important of these specialized stores, accounting for 3.8, 1.4, and 0.8 percent of total food store sales in 1958.

Eating places are of less importance as an outlet for food. In 1958, deflated sales of eating places in the West were 25 percent as large as sales in food stores. They accounted for 27 percent of total retail food sales in California, 21 percent in Washington-Oregon, and 24 percent in the Mountain States.

Deflated Sales and Employment

Food Stores.--Deflated sales of retail food stores in the Western Region increased over 50 percent between 1948 and 1958 (table 11). Increases in retail sales were about 55 percent in California and the Mountain States and 40 percent in Washington-Oregon. The variation corresponded largely to the variation in population increase. California's increase in population amounted to 46.5 percent and the Mountain States 38.0 percent compared with 23.4 percent for Washington-Oregon for the 10-year period.

Table 10.--Wholesaling farm products: Number of establishments, deflated sales and employment per establishment, California, Washington-Oregon, Mountain States, and Western Region, 1948, 1954, and 1958

Type of product and year	California			Washington-Oregon		
	Establishments	Per establishment		Establishments	Per establishment	
		Deflated sales	Employment		Deflated sales	Employment
	Number	Dollars	Number	Number	Dollars	Number
Groceries and edible farm products:						
1948	3,444	956,408	17.0	1,155	902,350	20.2
1954	3,733	1,319,283	16.6	1,265	1,021,239	15.9
1958	3,991	1,417,881	16.4	1,252	1,140,735	14.3
Farm products, raw materials:						
1948	250	2,012,264	7.1	292	1,257,397	6.0
1954	373	2,112,142	19.5	348	1,306,693	8.0
1958	385	2,204,597	11.4	407	1,845,759	7.6
Total groceries and farm products:						
1948	3,694	1,027,865	16.3	1,447	973,997	17.3
1954	4,106	1,391,309	16.9	1,613	1,082,825	14.2
1958	4,376	1,487,096	16.0	1,659	1,313,697	12.7
	Mountain States			Western Region		
Groceries and edible farm products:						
1948	1,401	581,484	12.4	6,000	859,457	16.5
1954	1,514	718,306	12.9	6,512	1,121,663	15.6
1958	1,642	816,581	12.2	6,885	1,224,080	15.0
Farm products, raw materials:						
1948	1,033	884,853	5.7	1,575	1,132,876	6.0
1954	1,020	1,113,100	6.5	1,741	1,365,836	9.6
1958	1,114	1,091,974	5.8	1,906	1,477,677	7.3
Total groceries and farm products:						
1948	2,434	710,235	9.5	7,575	915,742	14.3
1954	2,534	877,221	10.3	8,253	1,173,172	14.3
1958	2,756	927,897	9.6	8,791	1,279,063	13.4

Table 11.--Retailing food products: Indexes of deflated sales and employment, California, Washington-Oregon, Mountain States, and Western Region, 1948, 1954, 1958 and projections by 5-year intervals 1970-85

(1954 = 100)

Establishment and year	California			Washington-Oregon		
	Deflated sales	Population	Employment 1/	Deflated sales	Population	Employment 1/
Food stores:						
1948	75	79	84	83	87	97
1954	100	100	100	100	100	100
1958	118	116	117	115	108	113
1970	164	154	133	156	138	126
1975	190	175	141	180	154	133
1980	220	200	149	207	171	140
1985	256	227	159	239	191	148
Eating places: 2/						
1948	78	79	88	86	87	102
1954	100	100	100	100	100	100
1958	129	116	136	112	108	118
1970	179	154	171	148	138	142
1975	211	175	194	169	154	156
1980	249	200	221	193	171	172
1985	293	227	250	220	191	188
	Mountain States			Western Region		
Food stores:						
1948	77	83	94	77	82	89
1954	100	100	100	100	100	100
1958	119	114	117	117	114	116
1970	169	149	135	163	150	131
1975	197	168	146	190	170	141
1980	230	190	155	220	192	149
1985	268	215	166	255	218	159
Eating places: 2/						
1948	76	83	85	79	82	90
1954	100	100	100	100	100	100
1958	124	114	136	126	114	133
1970	178	149	178	174	150	168
1975	211	168	203	204	170	191
1980	249	190	230	240	192	215
1985	294	215	262	282	218	244

1/ Projected employment is based on an annual compound rate of growth in output per worker of 1.75 percent for food stores and 0.75 percent for eating places. These productivity estimates were developed by Waldorf and Gale (22).

2/ Includes restaurants, cafeterias, refreshment stands, and other eating places.

Sales of food stores increased somewhat faster than population growth in each of the areas in the Western Region. Part of the increase probably was the result of an increase in sales of nonfood items in food stores. Some of the increase in deflated sales per capita may have resulted from increased marketing services per unit of food handled, as well as shifts to more expensive types of food. Data are not available, however, to indicate the relative contribution of the different factors to increase sales per capita.

Since sales in food stores were expected to increase in some relation to growth in population, projected sales were based on projected population. A linear relationship between deflated sales and population was determined on the basis of the 3 census years. This relationship was used to project sales. Sales of food store are projected to increase about 156 percent for California, 139 percent for Washington-Oregon, 168 percent for the Mountain States, and 155 percent for the Western Region from 1954 to 1985.

Increases in labor productivity in food stores were not large between 1948 and 1958. The largest gains were made between 1948 and 1954, when the shift toward self-service in stores continued at a good pace. It is not known, however, how much the shift to self-service affected labor productivity. 27/ Between 1954 and 1958, productivity gains were smaller, and the percentage increase in employment was only slightly less than in sales.

Employment projections for food stores are based on estimates of increases in labor productivity from 1929 to 1958 derived by Waldorf and Gale (21). Using the projected increase in productivity of 1.75 percent annually, employment is projected to increase about 60 percent in California, 50 percent in Washington-Oregon, and 65 percent in the Mountain States from 1954 to 1985.

Eating Places.--Deflated sales for eating places in the Western Region are about 25 percent as large as sales in food stores. Considerably more services, such as labor in preparation are involved in the sales of restaurants and cafeterias, so the quantity of food sold is an even smaller percentage of that sold in food stores.

Sales of eating places increased about 65 percent in California and the Mountain States between 1948 and 1958. This was somewhat larger than the sales increase in food stores in these two areas during the same period. Sales in Washington-Oregon increased 30 percent, or slightly less than the increase in food stores.

Projection of sales for eating places was determined by relating sales to population growth in the base period 1948-58. Sales were projected to increase 193 percent in California, 120 percent in Washington-Oregon, and 194 percent in the Mountain States between 1954 and 1985.

Labor productivity in eating places in the Western Region increased about 0.75 percent annually from 1929-58 (Waldorf and Gale 21). The projected increases from 1954 in employment in eating places, based on this increase in productivity, are about 150 percent for California, 90 percent for Washington-Oregon, and 160 percent for the Mountain States.

27/ Labor productivity as measured here, deflated sales per employee, reflects not only changes in productivity but changes in services performed. For example, the shift to self-service has reduced the service performed, (although some may prefer to served themselves) whereas increased consumer packaging of meat may have increased the packaging (service performed) but reduced the personal service and attention given to the customer.

Earnings and Unit Labor Costs

Average annual earnings of employees in food stores in the Western Region increased 35 percent from 1948 to 1958 with most of the increase occurring from 1948 to 1954. The increase in annual earnings was fairly uniform throughout the Western Region (table 12).

The average annual earnings in eating places increased 27 percent between 1948 and 1958, with all of the gain occurring between 1948 and 1954. As with food stores, the gain in earnings was uniform in the different areas of the Western Region.

Increases in productivity in food stores and eating places between 1948 and 1958 were not as large as the increases in earnings, resulting in increased unit labor costs between these years. For the Western Region increases in unit labor costs were 34 percent in food stores and 22 percent in eating places.

Table 12.--Retailing food products: Indexes of average annual earnings per employee and unit labor costs, California, Washington-Oregon, Mountain States, and Western Region, 1948, 1954, and 1958

(1954 = 100)

Establishment and year	California		Washington-Oregon	
	Avg. annual earnings per employee	Unit labor costs 1/	Avg. annual earnings per employee	Unit labor costs 1/
Food stores:				
1948	78	83	77	86
1954	100	100	100	100
1958	103	109	108	118
Eating places: 2/				
1948	80	90	77	93
1954	100	100	100	100
1958	101	109	101	109

	Mountain States		Western Region	
Food stores:				
1948	76	83	77	83
1954	100	100	100	100
1958	105	111	104	111
Eating places: 2/				
1948	78	88	79	90
1954	100	100	100	100
1958	100	113	100	110

1/ Unit labor costs = annual payroll ÷ annual deflated sales.
2/ Includes restaurants, cafeterias, refreshment stands, and other eating places.

Number and Size of Establishments

A marked decline in the number of food stores in each of the areas of the Western Region occurred between 1948 and 1958 (table 13). The decline amounted to 12 percent in California, 24 percent in Washington-Oregon, and 28 percent in the Mountain States. This decline is related to the increase in the number of large supermarkets and the decrease in the number of small neighborhood stores.

Increases in deflated sales per food store between 1948 and 1958 amounted to about 80 percent in California, 85 percent in Washington-Oregon, and 110 percent in the Mountain States. Although each area had a large increase in total deflated retail food sales, even larger percentage increases in sales per store resulted in the decline in number of stores.

In contrast to food stores, the number of eating places increased. For the Western Region, the number of establishments increased about 25 percent and deflated sales per establishment increases about 25 percent between 1948 and 1958.

Table 13.--Retailing food products: Number of establishments, deflated sales and employment per establishment, California, Washington-Oregon, Mountain States, and Western Region, 1948, 1954, and 1958

Establishment and year	California			Washington-Oregon		
	Establishments	Per establishment		Establishments	Per establishment	
		Deflated sales	Employment		Deflated sales	Employment
	Number	Dollars	Number	Number	Dollars	Number
Food stores:						
1948	23,898	120,711	3.9	10,102	93,093	3.3
1954	23,061	167,742	4.8	8,958	126,879	3.8
1958	21,083	215,534	6.1	7,696	169,570	5.0
Eating places: 1/						
1948	17,306	43,141	6.3	5,691	36,399	6.1
1954	18,673	51,293	6.7	5,599	42,783	6.1
1958	22,144	55,967	7.7	6,190	43,385	6.5

	Mountain States			Western Region		
Food stores:						
1948	12,729	82,543	3.2	46,729	104,343	3.6
1954	10,061	135,475	4.4	42,080	151,329	4.5
1958	9,282	174,252	5.5	38,061	196,173	5.7
Eating places: 1/						
1948	7,045	34,379	6.1	30,042	39,809	6.2
1954	7,701	41,341	6.6	31,973	47,405	6.6
1958	9,434	41,937	7.3	37,768	50,400	7.4

1/ Includes restaurants, cafeterias, refreshment stands, and other eating places.

BIBLIOGRAPHY

(1) Daly, Rex F.
1954. SOME CONSIDERATIONS IN APPRAISING THE LONG-RUN PROSPECTS FOR AGRICULTURE. In Natl. Bur. Econ. Res., Long-Range Economic Projections, Studies in Income and Wealth 16: 143-153.

(2) _____
1956. THE LONG-RUN DEMAND FOR FARM PRODUCTS. U.S. Dept. Agr. Agr. Econ. Res. 8: 73-91.

(3) _____
1963. LONG-RUN ECONOMIC PROJECTIONS: A REVIEW AND APPRAISAL. U.S. Dept. Agr., Agr. Econ. Res. 15: 113-121.

(4) Dean, Gerald W. and McCorkle, Jr., Chester O.
1961. PROJECTIONS RELATING TO CALIFORNIA AGRICULTURE IN 1975. Calif. Agr. Expt. Sta., Bul. 778: 1-57.

(5) Fabricant, Solomon.
1940. OUTPUT OF MANUFACTURING INDUSTRIES, 1899-1937. Natl. Bur. Econ. Res. Inc., New York, N. Y.

(6) _____
1942. EMPLOYMENT IN MANUFACTURING. Natl. Bur. Econ. Res. Inc., New York, N.Y.

(7) Food and Agricultural Organizations of the United Nations.
1962. AGRICULTURAL COMMODITIES--PROJECTIONS FOR 1970. FAO Commodity Review 1962, Special Supplement, Rome, Italy.

(8) Fuchs, Victor R.
1962. CHANGES IN THE LOCATION OF MANUFACTURING IN THE UNITED STATES SINCE 1929. Yale Univ. Press, New Haven and London.

(9) Kuznets, Simon.
1954. CONCEPTS AND ASSUMPTIONS IN LONG-TERM PROJECTIONS OF NATIONAL PRODUCT. In Natl. Bur. Econ. Res., Long-Range Economic Projections, Studies in Income and Wealth 16: 9-42.

(10) Perloff, Harvey S., et al.
1961. REGIONS, RESOURCES, AND ECONOMIC GROWTH. Resources for the Future. John Hopkins Press, Baltimore, Md.

(11) Poli, Adon.
1963. LONG-TERM PRODUCTION PROSPECTS FOR WESTERN AGRICULTURAL. U.S. Dept. Agr., Agr. Econ. Rpt. 33.

(12) Stallings, Dale G.
1963. MARKETING WESTERN FRUITS AND VEGETABLES, LONG-TERM OUTLOOK. U.S. Dept. Agr., Econ. Res. Serv., ERS 77.

(13) U.S. Department of Agriculture.
1956. HOUSEHOLD FOOD CONSUMPTION SURVEY 1955, Reports No. 1 and 5. Washington.

(14) U.S. Department of Commerce.
1949-61. CENSUS OF MANUFACTURES: 1947; 1954; 1958. Washington.

(15) _____
1950-61. CENSUS OF BUSINESS: 1948; 1954; 1958. Washington.

(16) _____
1960. POPULATION PROJECTIONS. Prepared for U.S. Senate Select Committee on National Water Resources, Committee Print 5.

(17) _____
1956. PERSONAL INCOME BY STATES SINCE 1929. A supplement to the Survey of Current Business. Off. Bus. Econ., Washington.

(18) _____
1963. SURVEY OF CURRENT BUSINESS. August issue. Off. Bus. Econ., Washington.

(19) Waldorf, William H.
1960. OUTPUT OF FACTORIES PROCESSING FARM FOOD PRODUCTS, 1909-1958. U.S. Dept. Agr., Tech. Bul. 1223.

(20) _____
1961. OUTPUT PER MAN-HOUR IN FACTORIES PROCESSING FARM FOOD PRODUCTS. U.S. Dept. Agr., Tech. Bul. 1243.

(21) _____ and Gale, Hazen F.
1965. OUTPUT PER MAN-HOUR IN DISTRIBUTING FOODS OF FARM ORIGIN. U.S. Dept. Agr., Tech. Bul. 1335.

APPENDIX A: METHODS AND SOURCES OF DATA

Data were obtained for three main areas of marketing--food processing, wholesaling, and retailing. Sources of data for each of these areas will be considered in turn.

Food Processing

The basic data on employment, value of shipments, value added, and payroll, in food processing were obtained from the Censuses of Manufactures for 1947, 1954, and 1958. Adjustments were made in data for industries manufacturing dairy products, prepared meats, bread and related products, and miscellaneous food preparations to make the 1947 and 1954 data comparable. Data on frozen packaged fish were estimated and excluded from the frozen foods data for 1947. The Census also made changes in classifications in 1958. However, for the industries affected, the Census also furnished data for the 1954 classification.

In the 1958 Census, value added data are adjusted, whereas 1954 and 1947 data are unadjusted. Adjusted value added is equal to value of shipments (including resales of finished products) less cost of finished products, materials, supplies, fuel, electric energy and contract work, plus the net change in the value of inventories of finished products and work-in-process between the beginning and end of the year, without adjustments for price changes. Unadjusted value added excludes resales of finished products and makes no adjustments for changes in inventories of finished products and work-in-process during the year. For use in this report, the 1958 data were made comparable with unadjusted value added data for the other 2 census years. Data for obtaining the unadjusted value added for 1958 were available only for the United States. However, ratios of unadjusted to adjusted value added data for the United States were used to convert State and regional data for 1958 to an unadjusted basis.

Projection of Consumption

Consumption figures for the base period 1947-61 were not available for the 11 Western States. Consequently, it was necessary to estimate consumption for the base period as well as to project the consumption for 5-year intervals from 1965 to 1985. This was done for each of the 11 Western States.

Basic per capita consumption-income relations for the Western Region were developed by William H. Waldorf, formerly of the Economic Research Service. 28/ The relationship between per capita food consumption and income was determined from the Household Food Consumption Survey of 1955 (13) conducted by the U.S. Department of Agriculture. These relationships were used to estimate per capita consumption in the base period 1947-61 and to project per capita food consumption to 1985. Use of the consumption-income relations implies that income is a prime determinant of different levels of consumption per person. While this is true, changes in tastes by consumers occur over time, creating upward or downward trends in addition to the effect of changes in income levels. For instance, fresh milk and butter have positive income elasticities. However, other factors have more than offset the positive effect of increases in income on per capita consumption the past several years. Consequently, the trend in per capita consumption of these two commodities has been downward. Therefore, the projected consumption of the following commodities obtained by the consumption-income relations were adjusted downward from 1955 by the following compound rates: Eggs, 1.5 percent; fluid milk and cream, 1 percent; butter, 2 percent; fresh citrus, 2 percent; noncitrus fruit, 1 percent; dried fruit, 1.5 percent; and wheat and flour, 0.2 percent. 29/

28/ See Appendix B for a table containing the income-consumption relations and a more detailed description of how they were obtained.

29/ Trends in consumption for dairy products and wheat and flour were taken from Rex F. Daly (appendix table 4 of reference listed in footnote 6).

Trends in consumption for the other commodities were derived from table 3, p. 6 of the same source. It was assumed that percentage changes in per capita consumption in the Western Region for these commodities would approximate the percentage change in United States per capita consumption. The differences between percentage change in United States per capita consumption projected by Daly and the projected percentage change in per capita consumption for the Western Region based on the consumption-income relations were assumed to be the trend factors in per capita consumption.

The projected beef consumption figures based on the income-consumption relations seemed too high. The income elasticity of beef is 0.726 (Appendix B). This income elasticity seems appropriate for ranges of income near the average income level in 1955. However, for the much higher average per capita income levels projected for 1985 the income elasticity may be too high, since the same percentage increase in income is likely to give smaller percentage increase in beef consumption at higher levels of income. Although an upward trend in per capita beef consumption may offset part of the overstatement of income elasticity in the higher income ranges, the beef consumption figures were adjusted downward about 10 percent in 1970 to 15 percent in 1985.

To estimate per capita consumption with the consumption-income relations, it was necessary to obtain income figures for the 11 Western States. Figures for the base years 1947-62 were obtained from Personal Income by States Since 1929 (17), and from the Survey of Current Business (18). The income figures for each of the 11 Western States were adjusted to 1954 dollars by consumer price indexes. California per capita personal income was deflated by a weighted average of consumer price indexes for Los Angeles and San Francisco. Per capita personal income for Washington and Oregon were deflated by a weighted average of consumer price indexes for Portland and Seattle. Per capita incomes in the Mountain States were deflated by a weighted average of consumer price indexes for these four western cities.

Average per capita incomes (in 1954 dollars) for each of the 11 Western States were projected by relating them to average gross national product (GNP) per capita (in 1954 dollars) for the years 1947 to 1962. The relationship which was finally selected was:

$$\text{Log } Y = a + bT$$

$$\text{Where } Y = \frac{\text{State per capita income}}{\text{U. S. per capita (GNP)}}$$

$$\text{And } T = \text{time}$$

This method allows the ratio of State per capita income to U.S. per capita (GNP) to vary systematically through time. Assuming that the relationships for each State would continue through the projected years, State per capita incomes in 1954 dollars were projected using the above relationship and projections of U.S. gross national product (3).

By substituting the base period and projected per capita income figures into the consumption-income relationships in Appendix B, per capita consumption figures were estimated for each State. These per capita consumption estimates were than adjusted for trends in consumption. Total consumption was estimated by multiplying the per capita consumption by estimates of population.

Projection of Production

Because of the large number of commodities covered, simplified procedures were needed to project factory processing and fresh food production for the 11 Western States. Production-consumption ratios were selected to meet this need. It was believed that changes in the ratio reflected, to some extent, the factor of demand--related to growth in population and income-- as well as costs of production and other factors affecting the comparative advantage in production. These ratios were also more stable and, therefore, easier to project than actual production figures.

Certain commodities, because of their perishability or bulkiness or because of institutional barriers to trade, will tend to be produced in the region in which they are consumed. Bread and pastries and fluid milk and cream are such commodities. The raw materials for bread and pastries may be produced in other regions, but, because of the perishability of the finished products, they are manufactured near the center of consumption. For these commodities, projection of production was simpler because it more nearly equals consumption.

For the industries which are less market oriented, shifts in location of production occur because of shifts in comparative advantage among regions. Changes in population, changes in relative costs, and development of new products are some of the factors which may change the comparative advantage of the region. 30/ These factors have their effect on production and consumption within a region and thus on the production-consumption ratio.

An attempt was made to relate the production-consumption ratio to population or income ratios, such as the ratio of State to Western Region population if the market was primarily an intraregional market; or Western Region to U.S. population if it was primarily a national market. Corresponding ratios of income in place of population were also tried. Since projections of population and income for the Western Region and the United States were available, projections of these ratios were available. If the ratios of population or income were related to the production-consumption ratio in the base period and the related movements seemed logical, then production was projected on the basis of the relationships.

For production-oriented industries, however, the change in the production-consumption ratios are less closely related to shifts in income or population. In these cases, the production-consumption ratio may move strongly upward or downward for a few years. But it would not be expected to continue at the same rate. Consequently, a limit was set on the upward or downward movement of the ratio. This procedure seems logical since a decrease in the production-consumption ratio is not expected to continue until production drops to zero. With rapid increases in the production-consumption ratio, an area would be producing a rapidly increasing percentage of the consumption of an area whose total consumption might be increasing rapidly due to growth of population and demand. 31/ This rapid increase in the production-consumption ratio also would not be expected to continue. As an additional check on the consistency and reasonableness of production projections, the change in the Western Region's share of U.S. production from 1957-58 to 1980 was estimated for the commodities covered.

30/ For a discussion of new product developments and processing methods which may affect the comparative advantage of the Western Region in the production of fruits and vegetables, see Stallings (12).

31/ This percentage may be greater than 100 percent.

With the production-consumption ratios and consumption projected to 1985, projected production was determined by a multiplication of these two projections.

While shifts in production tend to continue in the same direction for a time, it is recognized that these trends tend to diminish or level off in time. Various changes or new developments in technology may come along which may strengthen, extend, or reverse the direction of a previous trend. Although these changes are, in general, not predictable and therefore cannot be allowed for in the projections, the possibilities must be recognized.

Wholesaling

Basic data on wholesaling were obtained from the Census of Business for 1948, 1954, and 1958. For the most part, changes in classification were not large. However, the definition of wholesale trade in the 1954 and 1958 Censuses differs from than in the 1948 Census by the exclusion of wholesale milk bottling plants. The 1954 Census revised U.S. data for 1948 to exclude the wholesale milk bottling plants. Since similar revised data for 1948 were unavailable for the Western Region, ratios of wholesale trade data for the United States before and after revision were used to adjust 1948 data to a basis comparable with 1954 for the Western Region. Since fewer data by type of wholesaler were given in 1958, data by type of wholesaler were combined for the other 2 census years to compare with 1958.

To obtain a measure of physical volume of wholesaling, sales were deflated by U.S. average wholesale price indexes. Two problems were involved in deflating the sales data. The first was that price indexes for the United States were used to deflate State or regional sales data. The second problem was selecting the wholesale price index appropriate to the type of wholesaling. For this analysis, the wholesale index for processed foods was used to deflate data relating to the wholesaling of grocery, confectionery, meat, and edible farm products. The wholesale index farm products was used to deflate sales data for farm products, raw materials.

Retailing

Sales, employment, and payroll data for retailing were obtained from the 1948, 1954, and 1958 Censuses of Business. Sales for the Mountain States were deflated by a weighted index of retail food prices in Los Angeles, San Francisco, Portland, and Seattle. Sales for California were deflated by a weighted index of retail food prices in Los Angeles and San Francisco, and Washington-Oregon by a weighted index of retail food prices in Portland and Seattle.

APPENDIX B: CONSUMPTION-INCOME RELATIONS AND METHODS OF DERIVATION 32/

Estimates and projections of food consumption used in this report are based principally on the consumption-income relations shown in appendix tables 1 and 2. For some of the commodities, adjustments also were made to allow for expected changes in the trend of consumption.

32/ The material in this appendix was developed by William H. Waldorf, formerly of ERS.

The estimated consumption-income relations are for farm-originated food products consumed by nonfarm households in the West. Attempts to estimate relations for farm households in the West were not successful. The relations are between household per capita consumption and household per capita income. This allows in part for differences in household size; it does not take into account "economies of scale" in consumption. Because of limited resources and time, no attempts were made to make more refined adjustment for household size or other demographic factors. Judging from findings in other budget studies, failure to adjust for household size means that the estimated income elasticities may be too high on this account.

The estimated consumption-income relations are based mainly on data from Household Food Consumption Survey 1955 (13). This report is referred to thereafter as HFCS. However, some of the income elasticities are based on unpublished data of the Economic and Statistical Analysis Division (ESAD) of the ERS. The estimates have also been reviewed for their "reasonableness" by ERS commodity specialists.

Consumption-income relations were first estimated for the United States as a whole. These and the per capita consumption and per capita income derived from the HFCS study for the West were used to estimate the relations shown in appendix table 1. Specifically, the income-consumption relations were estimated as follows:

(1) Household consumption and income data given in the HFCS for the United States and for the West were first put on a per capita basis.

(2) Using data for the United States as a whole, consumption-income relations were fitted to 5 different equations in order to discover the "best" form. These 5 forms include the simple hypothesis of a constant income elasticity as well as hypotheses describing different "laws" of change of the income elasticity over the range of incomes. The 5 forms used were:

(a) $y = a + bx$
(b) $\text{Log } y = \log a + b \log x$
(c) $\text{Log } y = a + bx$
(d) $y = a + b \log x$
(e) $y = a - b/x$

In general, equation (b) assuming a constant income elasticity yielded the best results (highest r's). In some instances where (b) was not the best but still statistically significant (and usually not significantly poorer than the best), it was also used. This arbitrary decision was based on the desire to simplify computations. In a few cases, equation (a) yielded the definitely best results and was used. Where none of the estimated equations showed income elasticities significantly larger than zero, the mean ($\bar{Y}$) was used.

(3) The results of (2) were shown to commodity specialists in ERS for review and suggestions. Where better estimates of the income elasticities were available, they were used. The results were also compared with those reported in other studies.

(4) The "final" estimated income-consumption relations for the United States together with per capita consumption and per capita income figures derived from the HFCS study for the West were used to estimate the relations for the West shown in the table.

Appendix table 1.--Consumption-income relations: Nonfarm households in the West 1/

Commodity	Unit	Log Y=a+b log X		Y = a + bX			Mean $\bar{Y}$	Per capita consumption in West 2/
		a	b	a	b	b $\bar{X}/\bar{Y}$		
Meat, poultry:								
Beef	Lb.	-2.138	0.726					1.571
Veal	Lb.	-2.559	.448					.076
Pork	Lb.						0.976	.976
Lamb, mutton	Lb.	-1.516	.195					.129
Variety meats and game	Lb.						.147	.147
Luncheon meats	Lb.						.368	.368
Poultry:								
Chicken	Lb.	-1.541	.392					.524
Turkey	Lb.	-2.725	.451					.053
Eggs	Doz.	-.344	.043					.621
Sugar, sweets:								
Sugar	Lb.	.265	-.129					.709
Sirups	Lb.	-.060	-.270					.118
Honey	Lb.						.024	.024
Jellies, jams	Lb.						.168	.168
Potatoes:								
Fresh, white	Lb.						1.479	1.479
Frozen	Lb.	-4.394	.799					.015
Canned, dehydrated	Lb.	-2.616	.310					.024
Potato chips and sticks	Lb.	-3.903	.772					.038
Fresh vegetables:								
Dark green and deep yellow	Lb.	-.469	.025					.409
Other green	Lb.	-.064	.020					1.000
Tomatoes	Lb.	-.592	.040					.344
Other	Lb.	-.969	.147					.318
Fresh fruits:								
Citrus	Lb.	-.848	.296					1.271
Other than citrus	Lb.	-.248	.153					1.750
Apples	Lb.			0.249	0.000090	0.3727		.397
Frozen fruits and vegetables:								
Fruits	Lb.	-3.468	.586					.026
Vegetables, other than potatoes	Lb.	-3.065	.732					.194
Beans, lima	Lb.	-3.288	.446					.014
Beans, snap, wax	Lb.	-4.092	.751					.021
Broccoli	Lb.	-4.268	.785					.018
Peas	Lb.	-4.291	.959					.062
Spinach	Lb.	-3.930	.701					.021
Corn	Lb.	-2.559						.075
Canned fruits and vegetables:								
Fruits excluding baby and junior foods	Lb.	-1.459	.370					.538
Apples, applesauce	Lb.	-2.334	.350					.062
Apricots	Lb.	-2.686	.383					.035
Berries	Lb.	-3.317	.465					.015
Cherries	Lb.			.010	.000003	.3333		.015
Peaches	Lb.	-1.841	.322					.156
Pears	Lb.	-2.436	.389					.065
Plums, prunes	Lb.	-7.829					.021	.021

Appendix table 1.--Consumption-income relations: Nonfarm households in the West 1/--Continued

Commodity	Unit	Log Y=a+b log X		Y = a + bX			Mean $\bar{Y}$	Per capita consumption in West 2/
		a	b	a	b	b $\bar{X}/\bar{Y}$		
Canned fruits and vegetables:--Continued								
Vegetables excluding baby and junior foods:								
Asparagus	Lb.	-3.412	0.583					0.029
Beans, snap, wax	Lb.	-1.436	.212					.176
Beets	Lb.	-3.033	.539					.050
Corn	Lb.						.129	.129
Peas, green	Lb.			0.081	0.000031	0.1480		.132
Tomatoes	Lb.			.096	.000006099	.0943		.106
Fruit and vegetable juices:								
Canned citrus:								
Orange	Lb.	-1.484	.194					.138
Grapefruit	Lb.						.079	.079
Canned fruit other than citrus	Lb.	-1.853	.357					.197
Canned tomato and other vegetables	Lb.	-2.147	.456					.209
Frozen concentrated:								
Orange	Lb.	-3.136	.672					.106
Dried fruits and vegetables:								
Dried fruit	Lb.			.054	.000010	.2394		.071
Dry vegetables	Lb.	1.660	-.793					.129
Miscellaneous foods:								
Nuts:								
Other than peanuts	Lb.	-3.738	.670					.026
Catsup, chili sauce, etc.	Lb.	-1.844	.317					.150
Pickles, olives, relishes	Lb.	-1.812	.299					.141

1/ Both consumption and income are on a per capita basis and are not corrected for the effect of "economies of scale." Regressions are based on weekly consumption data.

The form used is not always the one with the highest coefficient of correlation (r). Forms which have a higher r than the one used are noted in an auxiliary table.

2/ Based on data from Household Food Consumption Survey 1955, (13, Rpt. 5). Per capita income for households included in this survey of the West was $1,639 in 1955.

Y = Weekly per capita consumption.
X = Annual per capita income.

Appendix table 2.--Expenditures-income relations for bakery products: Nonfarm households in the West

Commodity	Relation	Per capita consumption
Bread, rolls, cakes and pies	Log Y = -1.055 + .203 Log X	0.396
Crackers	Log Y = -2.205 + .244 Log X	.038

Y = Weekly per capita expenditure in dollars.
X = Annual per capita income.

Appendix table 3.--Population of the 11 Western States, 1947-62 and projections by 5-year projections 1965-85 1/

Year	Arizona	California	Colorado	Idaho	Montana	Nevada	New Mexico	Oregon	Utah	Washington	Wyoming	Western Region
	Thous.	Thous.	Thous.	Thous.	Thous.	Thous.	Thous.	Thous.	Thous.	Thous.	Thous.	Thous.
1947	652	9,912	1,236	522	530	149	582	1,364	636	2,225	256	18,064
1948	690	10,064	1,263	551	542	156	604	1,405	653	2,255	269	18,452
1949	714	10,337	1,295	570	569	157	644	1,431	671	2,294	277	18,959
1950	756	10,674	1,337	592	598	162	687	1,532	696	2,386	292	19,712
1951	786	11,159	1,328	587	593	169	725	1,564	710	2,431	293	20,345
1952	843	11,785	1,378	582	597	181	747	1,595	730	2,459	297	21,194
1953	895	12,305	1,454	589	608	196	775	1,623	749	2,485	295	21,974
1954	932	12,738	1,520	589	613	215	784	1,652	762	2,539	300	22,644
1955	963	13,156	1,583	604	622	240	808	1,690	798	2,630	315	23,409
1956	1,021	13,724	1,655	619	646	250	823	1,726	823	2,689	321	24,297
1957	1,113	14,235	1,693	639	662	257	870	1,735	838	2,740	323	25,105
1958	1,180	14,744	1,690	645	664	266	904	1,735	855	2,783	322	25,788
1959	1,254	15,334	1,727	658	667	279	928	1,756	877	2,823	325	26,628
1960	1,325	15,855	1,769	671	680	291	958	1,781	901	2,868	332	27,431
1961	1,426	16,414	1,841	686	699	317	986	1,777	940	2,950	339	28,375
1962	1,486	17,029	1,893	700	697	350	997	1,807	958	3,010	332	29,259
1965	1,465	17,557	1,955	735	751	330	1,043	1,995	1,010	3,176	359	30,376
1970	1,649	19,601	2,179	810	837	382	1,144	2,249	1,146	3,535	391	33,923
1975	1,914	22,327	2,429	891	920	441	1,307	2,502	1,296	3,944	430	38,401
1980	2,222	25,433	2,709	981	1,012	508	1,493	2,783	1,466	4,401	473	43,481
1985	2,580	28,971	3,021	1,080	1,113	585	1,705	3,056	1,658	4,911	520	49,200

1/ Population data for the years 1947-62 are from U.S. Bureau of the Census, Current Population Reports, Series P-25. All estimates are as of July 1.

Population projections are the same as those used by the Bonneville Power Administration in a study of future power needs of the Pacific Northwest. The sources of data and methods of derivation are as follows: Projection of population for 1970 and 1980 were from Population Projections (16), Series II (1955-57 fertility level remains constant), Assumption 2 (average annual interstate migration equal to one-half that of 1940-58) projections are used. Each State's rate of population growth from 1960 to 1970 and from 1970 to 1980 are used to derive 1965 and 1975 population, respectively. Each State's rate of population growth from 1970 to 1980 is extended 5 years to derive 1985 population.

Since this report was completed, the Bureau of the Census has published new alternative series of projections of State populations in Current Population Reports, Series P-25, Number 301, February 1965. Population projections from Series II-B (moderate decline in fertility from present levels; convergence of State gross migration rates during projection period) are shown below:

Area	1970 Thous.	1975 Thous.	1980 Thous.	1985 Thous.
California	21,077	23,962	27,100	30,368
Washington-Oregon	5,227	5,645	6,124	6,639
Mountain States	8,788	9,785	10,884	12,036
Western Region	35,092	39,392	44,108	49,043

Appendix table 4.--Average per capita personal income of the 11 Western States in constant dollars, 1947-61 and 5-year intervals, 1965-85 1/

(1954 dollars)

Year	Arizona	California	Colorado	Idaho	Montana	Nevada	New Mexico	Oregon	Utah	Washington	Wyoming
1947	1,397	2,035	1,627	1,521	1,771	2,106	1,201	1,854	1,432	1,829	1,809
1948	1,405	1,982	1,577	1,449	1,805	1,979	1,216	1,810	1,379	1,800	1,758
1949	1,413	1,956	1,572	1,406	1,578	1,995	1,263	1,768	1,389	1,796	1,802
1950	1,461	2,077	1,629	1,443	1,805	2,186	1,311	1,783	1,446	1,862	1,831
1951	1,626	2,125	1,792	1,506	1,845	2,274	1,344	1,816	1,519	1,877	1,962
1952	1,673	2,152	1,811	1,591	1,805	2,391	1,360	1,845	1,520	1,928	1,848
1953	1,610	2,165	1,714	1,499	1,798	2,357	1,361	1,808	1,526	1,965	1,854
1954	1,604	2,154	1,673	1,494	1,747	2,363	1,388	1,767	1,500	1,952	1,790
1955	1,700	2,302	1,762	1,521	1,866	2,430	1,437	1,853	1,559	1,977	1,814
1956	1,787	2,385	1,821	1,628	1,872	2,381	1,503	1,932	1,619	2,007	1,883
1957	1,715	2,376	1,889	1,594	1,837	2,387	1,529	1,852	1,655	2,011	1,911
1958	1,717	2,318	1,932	1,598	1,853	2,377	1,584	1,894	1,624	1,985	1,965
1959	1,748	2,410	1,973	1,621	1,800	2,459	1,645	1,992	1,681	2,053	2,003
1960	1,789	2,412	2,028	1,568	1,781	2,480	1,605	1,996	1,697	2,064	2,029
1961	1,789	2,442	2,054	1,587	1,683	2,520	1,574	1,973	1,720	2,087	1,904
1965	2,020	2,693	2,248	1,680	1,852	2,868	1,819	2,124	1,893	2,253	2,071
1970	2,291	3,022	2,561	1,752	1,881	3,240	2,096	2,262	2,127	2,410	2,223
1975	2,532	3,304	2,843	1,816	1,900	3,567	2,352	2,395	2,329	2,562	2,324
1980	2,798	3,613	3,156	1,870	1,906	3,927	2,640	2,519	2,550	2,707	2,430
1985	3,100	3,960	3,512	1,922	1,908	4,334	2,970	2,644	2,799	2,854	2,547

1/ Per capita personal incomes in current dollars from 1947-61 were obtained from Personal Income by States Since 1929 (17) and Survey of Current Business (18). For a description of the price indexes used to derive per capita income in 1954 dollars and the method used to project the income, see Appendix A.